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NATIONAL DEFENSE AUTHORIZATION ACT FOR FISCAL YEAR 1996—S. 1124 (H.R. 1530)

AND

OVERSIGHT OF PREVIOUSLY AUTHORIZED PROGRAMS

BEFORE THE

COMMITTEE ON NATIONAL SECURITY
HOUSE OF REPRESENTATIVES

ONE HUNDRED FOURTH CONGRESS

FIRST SESSION

MILITARY PROCUREMENT SUBCOMMITTEE HEARINGS

ON

TITLE I—PROCUREMENT

HEARINGS HELD

MARCH 7, 9, 15, 16, 29, 30, APRIL 6, 1995

SUPERINTENDENT OF DOCUMENTS

OCT 30 1996

[H.N.S.C. No. 104–4]

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104TH CONGRESS
1ST SESSION

H. R. 1530

To authorize appropriations for fiscal year 1996 for military activities of the Department of Defense, to prescribe military personnel strengths for fiscal year 1996, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MAY 2, 1995

Mr. SPENCE (for himself and Mr. DELLUMS) (both by request) introduced the following bill; which was referred to the Committee on National Security

---

A BILL

To authorize appropriations for fiscal year 1996 for military activities of the Department of Defense, to prescribe military personnel strengths for fiscal year 1996, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "National Defense Authorization Act for Fiscal Year 1996".

* * * * * * *

TITLE I—PROCUREMENT

SEC. 101. ARMY.

(a) AIRCRAFT.—Funds are hereby authorized to be appropriated for procurement of aircraft for the Army as follows:

(1) $1,223,067,000 for fiscal year 1996.

(2) $843,391,000 for fiscal year 1997.

(b) MISSILES.—Funds are hereby authorized to be appropriated for procurement of missiles for the Army as follows:

(1) $676,430,000 for fiscal year 1996.

(2) $717,757,000 for fiscal year 1997.

(c) WEAPONS AND TRACKED COMBAT VEHICLES.—Funds are hereby authorized to be appropriated for procurement of weapons and tracked combat vehicles for the Army as follows:

(1) $1,298,986,000 for fiscal year 1996.

(2) $1,261,691,000 for fiscal year 1997.

(d) AMMUNITION.—Funds are hereby authorized to be appropriated for procurement for ammunition for the Army as follows:

(1) $795,015,000 for fiscal year 1996.

(2) $830,644,000 for fiscal year 1997.

1 (e) OTHER PROCUREMENT.—Funds are hereby au-
2 thorized to be appropriated for procurement for ammuni-
3 tion for the Army as follows:
4 (1) $2,256,601,000 for fiscal year 1996.
5 (2) $2,198,702,000 for fiscal year 1997.
6 **SEC. 102. NAVY AND MARINE CORPS.**
7 (a) AIRCRAFT.—Funds are hereby authorized to be
8 appropriated for procurement of aircraft for the Navy as
9 follows:
10 (1) $3,886,488,000 for fiscal year 1996.
11 (2) $6,885,201,000 for fiscal year 1997.
12 (b) WEAPONS.—Funds are hereby authorized to be
13 appropriated for procurement of weapons (including mis-
14 siles and torpedoes) for the Navy as follows:
15 (1) $1,787,121,000 for fiscal year 1996.
16 (2) $1,714,337,000 for fiscal year 1997.
17 (c) SHIPBUILDING AND CONVERSION.—Funds are
18 hereby authorized to be appropriated for shipbuilding and
19 conversion for the Navy as follows:
20 (1) $5,051,935,000 for fiscal year 1996.
21 (2) $3,941,565,000 for fiscal year 1997.
22 (d) OTHER PROCUREMENT, NAVY.—Funds are here-
23 by authorized to be appropriated for other procurement
24 for the Navy as follows:
25 (1) $2,396,080,000 for fiscal year 1996.

1 (2) $3,124,435,000 for fiscal year 1997.

2 (e) MARINE CORPS.—Funds are hereby authorized to
3 be appropriated for procurement for the Marine Corps as
4 follows:

5 (1) $474,116,000 for fiscal year 1996.

6 (2) $687,917,000 for fiscal year 1997.

7 **SEC. 103. AIR FORCE.**

8 (a) AIRCRAFT.—Funds are hereby authorized to be
9 appropriated for procurement of aircraft for the Air Force
10 as follows:

11 (1) $6,183,886,000 for fiscal year 1996.

12 (2) $6,576,934,000 for fiscal year 1997.

13 (b) MISSILES.—Funds are hereby authorized to be
14 appropriated for procurement of missiles for the Air Force
15 as follows:

16 (1) $3,647,711,000 for fiscal year 1996.

17 (2) $4,422,579,000 for fiscal year 1997.

18 (c) OTHER PROCUREMENT.—Funds are hereby au-
19 thorized to be appropriated for other procurement for the
20 Air Force as follows:

21 (1) $6,804,696,000 for fiscal year 1996.

22 (2) $6,904,630,000 for fiscal year 1997.

23 **SEC. 104. DEFENSE-WIDE ACTIVITIES.**

24 Funds are hereby authorized to be appropriated for
25 Defense-wide procurement as follows:

1 (1) $2,179,917,000 for fiscal year 1996.

2 (2) $2,524,975,000 for fiscal year 1997.

3 **SEC. 105. DEFENSE INSPECTOR GENERAL.**

4 Funds are hereby authorized to be appropriated for
5 procurement for the Inspector General of the Department
6 of Defense as follows:

7 (1) $1,000,000 for fiscal year 1996.

8 (2) $1,800,000 for fiscal year 1997.

9 **SEC. 106. CHEMICAL DEMILITARIZATION PROGRAM.**

10 Funds are hereby authorized to be appropriated for
11 the destruction of lethal chemical weapons in accordance
12 with section 1412 of the Department of Defense Author-
13 ization Act, 1986 (50 U.S.C. 1521) and the destruction
14 of chemical warfare material of the United States that is
15 not covered by section 1412 of such Act as follows:

16 (1) $746,698,000 for fiscal year 1996.

17 (2) $828,747,000 for fiscal year 1997.

18 **SEC. 107. DEFENSE HEALTH PROGRAM.**

19 Funds are hereby authorized to be appropriated for
20 procurement for the Defense Health Program as follows:

21 (1) $288,033,000 for fiscal year 1996.

22 (2) $298,486,000 for fiscal year 1997.

1 **SEC. 108. REPEAL OF REQUIREMENT FOR SEPARATE BUDG-**
2 **ET REQUEST FOR PROCUREMENT OF RE-**
3 **SERVE EQUIPMENT.**

4 Section 114(e) of title 10, United States Code, is re-
5 pealed.

* * * * * * *

1996 NATIONAL DEFENSE AUTHORIZATION REQUEST

HOUSE OF REPRESENTATIVES, COMMITTEE ON NATIONAL SECURITY, MILITARY PROCUREMENT SUBCOMMITTEE, AND THE MILITARY RESEARCH AND DEVELOPMENT SUBCOMMITTEE,

Washington, DC, Tuesday, March 7, 1995.

The subcommittees met, pursuant to call, at 9:30 a.m., in room 2118, Rayburn House Office Building, Hon. Duncan Hunter (chairman of the Military Procurement Subcommittee) presiding.

OPENING STATEMENT OF HON. DUNCAN HUNTER, A REPRESENTATIVE FROM CALIFORNIA, CHAIRMAN, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. HUNTER. The subcommittees will come to order. Welcome ladies and gentlemen. We have a very sweeping and in-depth hearing today. We are going to be going probably for the next 4½ hours because we have a lot of information that we have to illicit, a number of people to give that information and a lot of members who will have questions.

Today, we begin our review of the administration's fiscal year 1996 budget request. Our hearing this morning is designed to provide a record for understanding the procurement holiday that the Pentagon has been on since the inception of the current administration.

We need to understand whether requirements continue to exist for certain hardware, as well as to understand the impact on industry if either such requirements do not exist or they are unfunded.

As long-term modernization programs continue to be delayed or canceled because resources have been diverted to cover near-term personnel and readiness shortfalls we must ask ourselves, first, how are we to maintain technological superiority of our forces if we continue to forego modernization?

Second, can the industrial base be preserved in the absence of near-term procurement or if not, cost effectively reconstituted at some future date?

With very few exceptions equipment modernization across the services has come to a virtual standstill. The fiscal year 1996 procurement request represents, in inflation adjusted terms, the lowest of any administration since 1950. It continues the 11-year fall amounting to a 71-percent reduction over this period. Worse, it is $9 billion less than indicated in budget documents just a year ago.

If Congress had made such a 1-year cut in the budget, we would have the Army marching up the Mall, the Marines camped in the Rayburn Horseshoe, the Air Force strafing Capitol Hill, that is probably where General Loh is right now, and the Navy steaming up the Potomac.

As a result of these cuts certain programs that the Department's Bottom-Up Review endorsed just 18 months ago have been slipped, terminated, or reduced to a development-only status.

Force structure replacement needs are underfunded. The industrial base is eroding dramatically. The ever present bow-wave of future requirements is ever growing. During the past several weeks we have heard from a number of the regional commanders in chief [CINC's], who have addressed the capabilities that they deem critical to prosecuting a major contingency in their theaters.

Today, we will hear from representatives of each of the military services who are at the forefront of determining equipment requirements; equipment that is needed to support the CINC's when called upon to do so.

We want these gentlemen to tell us how their requirements are faring in this procurement holiday environment. We will also hear from a panel of representatives from six segments of the defense industry that have undergone major restructuring over the last several years and that due to the procurement holiday forecast in this budget are faced with dim prospects for the future.

These segments are the manufacturers of fighter aircraft, nonnuclear surface ships, track vehicles, helicopters, small arms, and ammunition. We are vitally interested in the health of these industry segments; whether they are being sustained or whether, as some fear, they are being crippled to the extent that either they or some other subcontractors and support vendors face extinction.

Joining us this morning on our military requirements panel are Gen. William Hartzog, Commanding General, Army Training and Doctrine Command; Vice Adm. Thomas J. Lopez, Deputy Chief of Naval Operations for Resources, Warfare Requirements and Assessments; Lt. Gen. Charles E. Wilhelm, Commanding General, Marine Corps Combat Development Command; and sitting in for Gen. John M. Loh, who I understand is not here yet, is Brig. Gen. Ted Campbell.

Gentlemen, thank you for being with us.

We also have a panel of industry witnesses who will come up after we have heard responses in given areas from the service representatives. We have with us Mr. Duane D. Fitzgerald, chairman, American Shipbuilding Association, who is also president and chief executive officer [CEO] of Bath Iron Works; Mr. Gordon R. England, president, Lockheed Fort Worth Co.; Mr. Thomas W. Rabaut, president and CEO, United Defense LP; Mr. Rhett Flater, executive director, the American Helicopter Society; Mr. David C. Hardison, chairman, Army Science Board Study, entitled Preservation of Small Arms Industrial Base; and Mr. Richard G. Palaschak, director, Munitions Industrial Base Task Force.

We welcome all of you. Thank you for being here. On an administrative note, we will receive opening remarks from both panels prior to beginning our questioning. We want to let everybody lay their statement out for the record.

However, before we begin I would like to call upon Mr. Weldon, the chairman of our Research and Development Subcommittee for any remarks he may have; followed by Mr. Skelton and Mr. Spratt, the ranking Democrats on the Procurement and Research and Development Subcommittees respectively.

Thank you for being here ladies and gentlemen. Mr. Weldon.

STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, MILITARY RESEARCH AND DEVELOPMENT SUBCOMMITTEE

Mr. WELDON. Thank you, Mr. Chairman. I am pleased that our subcommittees have come together for this vital issue of service modernization. It is not coincidental that this will be the first hearing for each of our subcommittees. I think that is indicative of the priority that we both place and that our subcommittees place on this issue.

While we acknowledge the Pentagon has tried to put its best face forward and minimize the impact the defense reductions have had on modernization, reductions have taken their toll. That is the purpose of today's hearing; perhaps our heaviest toll in this area.

As our chairman stated, the fiscal year 1996 budget request includes the lowest percentage of defense procurement funds since the 1950's. What is particularly troubling to me is that while we have cut defense by 25 percent over the last 5 years, we have increased nondefense spending by 361 percent out of the growing each year smaller defense budget.

These are tough years for us, yet while we are cutting acquisition funds by $9 billion this year over last, we, in fact, have increased to over $20 billion the amount of defense money that we are using for, in some cases, questionable programs that do not have direct ties to our military.

Some have suggested that the administration's budget has sent the services on a procurement holiday as our chairman stated. I would submit that it is more like a procurement furlough. I think it is high time the Nation gets back to work on this issue that is so vital to our national security.

It is up to us to fully assess the previous year reductions and how they have impacted modernization to date and how this year's request will affect the future force. While our previous efforts to correct readiness are beginning to pay off, they will be incomplete if we do not provide adequate equipment upon which our forces can train and operate in the field.

Let me give you a real example. I am sure we will hear many today. Let's take the CH–46, the workhorse for the Marine Corps for their medium lift requirements. The CH–46 today, a 30-year-old aircraft with 40-year-old technology is the mainstay of our forces anyplace they are called around the world.

Night training in terms of night flying has to be done using a Band-Aid approach where the pilots actually have to put tape over portions of the instrumentation. The pilots are required to do evasive maneuvering when they are in a combat situation, but they cannot train for that because of the limitations on the aircraft.

The aircraft are supposed to carry a certain number of troops, yet they cannot train with those numbers of troops because of the limitations placed on the aircraft. These are real facts involving real pilots and are a part of the reason why we have had a significant increase in the number of accidents over the past several years.

We must look at these factors, as well as the impact of reductions on the industrial base so that members are not making deci-

sions on the defense top line or the authorization process in a vacuum. We have an outstanding group of service and industry officials to help us with this task. I look forward to their candid views. Thank you, Mr. Chairman.

Mr. HUNTER. Thank you, Mr. Weldon. Mr. Skelton.

STATEMENT OF HON. IKE SKELTON, A REPRESENTATIVE FROM MISSOURI, RANKING MINORITY MEMBER, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. SKELTON. Thank you. Mr. Hunter, I first say that I look forward to working with you and the other members of this subcommittee. What we do and the decisions we make will make a great deal of difference in the years and decades ahead. I take this job quite seriously.

I think that all of us realize that the most important element and ingredient in national defense are the young men and young women that we have in uniform. I was intrigued by the phrase "procurement holiday." By reading the front page of the Washington Post this morning it appears we have a military housing holiday which sadly interferes with keeping good people.

Assume that we can do that. I think everyone on this committee and subcommittee understands the priority of keeping good people in uniform. We first must realize we are preparing not to fight the last war.

What made the big difference in several instances in Desert Storm was our technological advantage, the global positioning system, the laser, the time-on-target with the first shot; all of these made a great deal of difference in winning a quick and decisive victory there.

The issue that I hope to explore today, Mr. Chairman, is that based upon a budget that is above that, that has been sent over by the administration. I am trying to do some broken-field running personally with a budget that increases the proposed budget through 1999 by $44 billion.

I address this to the members because questions will be put to you by myself and I am sure others will ask along the same line. Assuming we can push up the margin of dollars available, what are those unfunded priorities that you would give for those extra few dollars if Congress does, as several of us wanted to do to have a higher budget?

The industrial base is so terribly important, but the industrial base for the last war is wrong. The helicopters for tomorrow, the surface ships for tomorrow, the small arms, the tactical aircraft, the ammunition for tomorrow, all of this is so very important.

How do we, as a Congress, balance these tactical important necessities of which you speak against the strategic items that we will also be wrestling with at later hearings, but will be entered into the same decision process?

These are the questions, Mr. Chairman, that I hope to ask. I want these distinguished witnesses to tell us, if there is a margin of additional dollars, what would your priorities be?

I look forward to your answers. Mr. Chairman, I look forward to working with you.

Mr. HUNTER. Thank you, Mr. Skelton. Let me tell you that working with you for so many years, I appreciate your wisdom and all of the talents you bring to this subcommittee. It is going to be similarly a real pleasure working with you.

I will tell you what, let's open up with our witnesses. General Hartzog, we will ask you to proceed, followed by Admiral Lopez and General Wilhelm. The floor is yours, General Hartzog.

STATEMENT OF GEN. WILLIAM HARTZOG, COMMANDING GENERAL, ARMY TRAINING AND DOCTRINE COMMAND

General HARTZOG. Thank you, Mr. Chairman and distinguished members of the committee. I am Gen. Bill Hartzog. I command the Army's Training and Doctrine Command. We are headquartered at Fort Monroe in Hampton, VA. I thank you very much for the opportunity to represent our Army here this morning.

My headquarters provides three services to the Army. We prepare the Army for war today, run its institutional training. We are the architect for the Army of the future and we build and sustain a command that is capable of doing those two things. I would like to focus on three of the more important functions that we do as the architect of the future.

We develop, we write, we teach doctrine. That is the codification of a body of thought about how we do our war fighting business.

Second, we write, teach and assist training from peace operations through major regional conflicts and most important to you today, we develop the front-end requirements for equipment which is to be provided to our Army modernization.

I make the point that modernization in the Army is underwritten for us by ideas and not by things. In 1980, as an example, we were a threat-based, concept-based organization. That was primarily before the demise of the Soviet Union.

Today we are a capabilities-based organization. We fully support the joint concepts and ideas about that. Tomorrow we believe that information will be at the center of how we will be formed and how we will operate of what we must be; technology-driven, an explosion and information movement and the value of information.

We think that will provide the battlefield a common situational awareness. We will all know much more about where we are and where the enemy is. Your Army has a concept and a plan for that future. We have intellectually walked out to the year 2010, looked around and written down what we think we see there in a pamphlet 525–5.

In the off chance that it is not exactly right, we are sure that it is not because we do not have a tremendously clear view, we have embarked on a series of experimentation and a valuation and analysis to test each of those hypothesis.

Of all of them in this book, the one that I would highlight again that we think we are very sound in assuming is that information will be of much greater value, both to us and to any of our potential enemies because of the explosion and ways to handle it.

We have a modernization plan. It is based on five principles. The first of which is the ability to project and sustain the force. The second is the ability to protect the force once it is projected. The third is to conduct precision strikes when required to do so. The fourth

is our ability to win the information war. The fifth is the ability to dominate land maneuvers.

These are the objectives for the basis of how we will grow to the next century. We put a label on this. We call it Force 21. Force 21 is about transforming our Army, America's Army. It is about re-engineering the sustaining base. It is about redefining the tactical Army. That is the deployable Army in terms of organizations; how we will fight; how we will handle this information value.

It is a way to underwrite the transformation of this vision into reality. It is three parts. It is battle laboratories which are under my command which generate new ideas, test new ideas, and new thoughts about the future. It is a series of advanced war fighting experiments. There are four of them that will occur this year.

I think we should think about those as major densities of exercises; ways to link live realities, that is soldiers on the ground testing things, with constructing realities, computers, with virtual realities into the new age of digitization, together, to test ideas.

Four of them this year. I have the schedule. We will make it available to you all. We would like very much for you to attend one or more of those if your schedule permits.

We also have an organization called the experimental force at Fort Hood, TX, in which we can implant some of these ideas that come out of the battle laboratories and out of these experiments; to actually put them on the ground in a live organization and test their relevancy.

In summary, the Army is trained and ready today. We have some ideas about the future that we have written down; a vision, a concept, a plan. We understand that it needs testing. Each of these hypothesis needs to be examined. We will do that through experimentation and the experimental force.

We do need your support. We need to invest today for readiness. We need to invest for tomorrow's readiness which is what this vision is about.

Mr. Chairman, finally, I would like to submit a formal statement for the record. Again, sir, I welcome the opportunity to represent our Army here this morning.

RECORD VERSION

STATEMENT BY

GENERAL WILLIAM W. HARTZOG

COMMANDER

UNITED STATES ARMY TRAINING AND DOCTRINE COMMAND

BEFORE THE

NATIONAL SECURITY COMMITTEE
RESEARCH AND DEVELOPMENT and PROCUREMENT SUB-COMMITTEES

OF THE

UNITED STATES HOUSE OF REPRESENTATIVES

FIRST SESSION, 104TH CONGRESS

ARMY MODERNIZATION -- A MEANS TO FORCE XXI

7 MARCH 1995

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BY THE HOUSE OF REPRESENTATIVES
NATIONAL SECURITY COMMITTEE,
RESEARCH AND DEVELOPMENT SUB-COMMITTEE, AND
PROCUREMENT SUB-COMMITTEE

GENERAL WILLIAM W. HARTZOG
STATEMENT TO UNITED STATES CONGRESS
WASHINGTON, D.C.
7 MARCH 1995

In just the few short years since our victory in the Cold War, the strategic environment for our Nation and our Army has radically changed. A new strategic focus, declining resources, and increased operational tempo has tested our readiness, while information age technologies are presenting unprecedented challenges for growth into the future both on the battlefield and in the institutional training base. Achieving the right balance between sustaining an acceptable level of readiness for contingencies today and implementing informed investment decisions for the future is a formidable task.

The destruction of the Berlin Wall announced more than just the demise of the former Soviet Union, it ended nearly a half century of bi-polar confrontation during which this Nation's primary strategic focus was on potential combat with a single, well-defined opponent. That is now history. In its place we have a far more intricate and wider range of security challenges that demand our Army be capable of executing a full range of missions across a broad assortment of contingencies and conditions in a world of complex and still emerging threats.

In this new strategic environment we have no single principal and measurable opponent as we did in the Cold War. Nor do we have such a focused comparative measure with which to gauge our own modernization. Instead, today we exist in an environment with a wide range of potential threats and a marketplace that rapidly provides an extensive array of modern technologies and weapons to all who can afford them. Therefore, our Army has had to adapt to this new era not only in structure and focus but also in how we change to meet the demands of this increasingly uncertain era.

For the last five years, in this post-Cold War era, the United States Army has made some tremendous changes to adapt to contemporary conditions. We have reduced our civilian and military manpower and cut our force structure while reposturing from a predominantly forward deployed force to a Force Projection Army. We have closed bases and adjusted to a constrained resource environment while responding to a 300 percent increase in operational commitments across a wide array of operations ranging from disaster relief in Florida to Desert Storm. All the while we have had one eye on modernizing the Army for the future and its promise of an even more uncertain and dynamic strategic setting.

That is what I want to address in this statement: our Army's plan for modernization and moving into the future. Our campaign is certainly about materiel development and acquisition but it is also much more. This extensive and comprehensive plan addresses all aspects; doctrine, training, leader development, organizational structure, materiel, and soldier issues, to change our Army into Force XXI.

FORCE XXI -- CAMPAIGN FOR THE FUTURE

We have labeled our process for change Force XXI. It is our bridge to the future, our Army's campaign plan to provide focus for the modernization and growth of the force into the 21st century. The Force XXI campaign plan is a descriptive process that will provide the framework for achieving modernization objectives. It consists of three mutually supporting axes. The main axis of the Force XXI campaign plan is Joint Venture whose objective is to plan, develop, and achieve Force XXI fielding decisions for the operational force by the end of the century. It will address modernization across the operational force, while the two supporting axes will focus on the institutional army and information technology respectively.

The Joint Venture objective is to redesign the operational force by way of sophisticated system of experiments and analysis of concepts, ideas, and technology in our battlefield laboratories culminating in a series of advanced warfighting experiments that test hypotheses. Experimentation in this manner will provide us the foundation on which to gauge the relative value of modernization investments, both in terms of materiel and technology investments and across the full range of doctrine, training and leader development, organizational structure, and soldier issues as well.

INTELLECTUAL LEADS PHYSICAL

The U.S. Army is a thinking and learning institution where physical change is constructed on a solid intellectual foundation. We have therefore, invested a lot of energy in developing our vision of the future. We have named it TRADOC Pam 525-5, *A Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-First Century.* It is how we envision Army operations in the future, a lighthouse, a starter set of ideas and thoughts to lead us forward to Force XXI.

There are several key ideas that are central precepts of TRADOC Pam 525-5. They are that information is far more important than it has ever been in our history and may well dominate how we organize and how we operate in the future. Also, internetted information systems will provide common situational awareness across the spectrum and could redefine command and staff processes and methods. Additionally, we will be able to know almost everything about the enemy and our own forces when a battle begins, and rapidly update our knowledge base throughout the conduct of the operation. Therefore, in the future, the control of information may well be the objective of conflict itself.

Of equal importance however, is the understanding that our Army's vision of the future is not one in which technology and machines are the principal element. It is not a view that relegates soldiers and leaders to the function of just manning equipment. Instead, it is built on the unchanged fundamental precept that the United States Army is about soldiers–and as always, in the future we will optimize the use of technology to assist soldiers and leaders together in well-trained units to do their work.

The high ground of the 21st century is information. So, our main effort is the development and acquisition of capabilities which leverage information technology to fully advantage the capabilities of our quality soldiers and leaders on the battlefield and venues for operations other than war. And we want to have modern technologies to train and educate them wherever they may be assigned or deployed, making a seemless linkage between what today we call the schoolhouse and units and soldiers around the world.

FORCE XXI MODERNIZATION OBJECTIVES

The description of our vision of the future is described in TRADOC Pam 525-5. It is quantified by our modernization objectives:

- Project and Sustain the Force: As a Force Projection Army we must have the capability to rapidly deploy and sustain Army forces wherever the mission demands. This objective requires necessary sea and air-lift capabilities to project and sustain the force and CONUS bases that are capable power projection platforms. Additionally, it calls for prepositioned equipment afloat and ashore and the acquisition of modern, lightweight combat and support systems and equipment.

• Protect the Force: The modern battlefield is becoming more lethal. Weapons of mass destruction exist along side precision weaponry and munitions. Theater ballistic missles provide an increasing menace to the survivability of soldiers and forces while fratricides still exist. This objective is about the development and acquisition of a theater ballistic missile defense system which includes a multi-faceted sensor system. It is about procuring technology to reduce fratricides. And it is about improved active and passive defense and protection against weapons of mass destruction.

• Win the Information War: We are in the information age and information -- acquisition, processing, and dissemination--may be the most powerful weapon of the next battlefield. Certainly we are seeing a growing body of that evidence in each succeeding operation we execute. Modern technologies, particularly in command and control, are having revolutionary effects on the battlefield and perhaps the very nature of warfare. This objective requires us to have electromagnetic spectrum supremacy. It means we must have a system of sensors and communications infrastructure to provide a seamless network of all information assets to real time intelligence wherever it is needed.

• Conduct Precision Strike: We have evolved far beyond the concept that striking deep in the enemy rear regulates the tempo of the close battle to a richer understanding that on the modern battlefield decisive victory is achieved most quickly when the enemy is engaged simultaneously throughout the depth of the battlefield. We saw this demonstrated during Desert Storm. This demands a capability to acquire and engage the enemy with precision strike weapons and munitions to rapidly and decisively defeat him with minimum collateral damage.

• Dominate the Maneuver Battle: As we have seen demonstrated on many modern battlefields, overmatching capabilities results in quick, decisive victory. We continue to achieve that objective in an environment of ever increasing battlefield lethality and tempo of operations. This objective requires us to continue to develop and procure capabilities that provide our Army with increased range and lethality of weapons, improved, high-tech armor, and information systems that result in the rapid massing of effects and forces on the enemy.

We have made some significant progress in moving toward our goals in some areas. In other areas we have not. The Army Modernization Plan which the Chief of Staff of the Army, General Sullivan, gave you two weeks ago describes in great detail the progress and shortfalls within each of our objectives by capability category and individual systems. This is a source of knowledge that provides decision makers with some timely and valuable information about materiel modernization. The Force XXI experimentation and analysis will surely get us to most of the insights required for the Army of the 21st century. Regardless of what these detailed efforts might bring, there are a few areas that are clearly key enabling investments that must be explored, and if cost effective, pursued under any emerging future. And I would like to specifically address three of them.

Digitization Information age technologies, specifically battlefield digitization, have the potential to fundamentally change how we fight. Digitization allows the combined arms team--combat elements and its support elements--to integrate information across the force providing a real time, common relevant view of the battlefield to all. Such integration of combat, combat support and combat service support, information will permit the rapid massing of overwhelming effects and forces for decisive victory and provides commanders with a quantum leap forward in increasing the lethality, survivability, and tempo of operations of the force.

Digitization is the cornerstone of the Army's Horizontal Technology Integration initiative and is an investment that will potentially revolutionize the battlefield of the future.

Comanche and Advanced Field Artillery System/Future Armored Resupply Vehicle (AFAS, and FARV) Two different systems with a common characteristic--they are both revolutionary developments with a tremendous array of 21st century technologies on single platforms. The design of each system is centered on state-of-the-art technologies that make each a revolutionary system while simultaneously providing the potential for horizontal technology integration across the force. Comanche is far more than a replacement for the aging OH-58D, but a whole new aircraft with a range of capabilities that include stealth technology, advanced avionics, precision weaponry, and an embedded digital capability that provides key information integration for the force. AFAS/FARV provide the Army with the capability to overmatch any potential enemy in fire support by providing an unprecedented concentration of firepower and a remedy to a long-standing deficiency in mobility and resupply for fire support. Again, investments that will revolutionize battlefields of the future and provide fire support capabilities equivalent to the revolutionary advancements demonstrated in digitizing maneuver force.

Combat Support/Combat Service Support (CS/CSS) Programs As demonstrated on the battlefields of history, forget logistics and you lose. The future battlefield, too, will demand CS/CSS systems of matching capabilities of the force they support. This wide range of programs advantages new technologies to ensure that modernization occurs across the force and makes CS/CSS as capable as the force it is designed to support. Investments such as those in modern tactical wheeled vehicles will replace a rapidly aging fleet and relieve a growing shortfall in our ability to sustain the force, and others such as Total Asset Visibility and Split-based operations will allow for timely and accurate logistics for a Force Projection Army.

But I want to remind you once again that our campaign plan for Force XXI is much broader than the acquisition of technology and materiel. It is a plan to modernize every aspect of our Army to include doctrine, training, leader development, organizational structure, materiel, and soldier issues. And that takes investments as well.

As always, the future is uncertain and unpredictable. But if history serves us in any way, it is illuminating of the truth that this Nation responds to challenges to our national security and to the cause of freedom. This Nation is a leader in providing humanitarian assistance and relief of suffering at home and around the world. Accordingly, this Nation requires an Army second to none to answer the challenge. We cannot predict with any degree of certainty how or where we will be needed, but we are certain that when our Army is called, we must be ready for decisive victory on the battlefield or convincing power in operations other than war--today and in the future. To achieve that level of performance we must have a measure of resource stability--manpower and dollars--beyond 1997 so we can sustain readiness today and plan and execute a strategy to move into the future--Force XXI.

SUMMARY

In summary, the United States Army is a changing army in a changing world. We are not resting on our record of what was and how great it was. We are moving toward the future to ensure that America's Army remains a strategic force, capable of decisive victory. We have tried to strike a resource balance between sustaining an acceptable level of readiness of training today with informed investments for the future. We are staying ahead of change to sustain the warfighting edge we have demonstrated in many recent

operations and that our Nation expects while building the force for tomorrow--Force XXI.

Mr. HUNTER. Thank you, General, without objection, all of the statements for the record will be accepted. Admiral Lopez.

STATEMENT OF ADM. T. JOSEPH LOPEZ, DEPUTY CHIEF OF NAVAL OPERATIONS FOR RESOURCES, WARFARE REQUIREMENTS AND ASSESSMENTS

Admiral LOPEZ. Thank you, Mr. Chairman, distinguished members of the committee, I appreciate the opportunity, as General Hartzog does, to address the joint session here. I know all of us are anxious to respond to your questions, so I will be brief.

With 80 percent of the world's population living within 200 miles of the world's coasts and with regional contingencies, the order of the day, the Navy and the Marine Corps have to be positioned forward, if we are to influence events, deter or control crisis and conflict, and if necessary be ready to transition to war.

Many of you have read our white paper, "Forward From the Sea and Forward Engagement." Forward deployment is the central thesis of that. To accomplish the Naval mission in the context of the national security strategy, the Navy and the Marine Corps, in order to help fight and win two MRC's and maintain forward presence, need the right tools.

For the Navy's part we need 346 ships, as the verse says. We 12 carriers, 11 air wings and all of the things that support those. As we saw last year, the need for Navy forces is not decreasing.

Last year, we were in seven contingencies, the Persian Gulf, Korea, the Indian Ocean including Somalia, Haiti, Cuba, the Mediterranean including Bosnia and we operated against drugs down in the Caribbean.

More than 50 percent of our ships were underway last year as an average. That was the highest nondeployed OPTEMPO since 1975—1975 is significant because that is when we started keeping records on OPTEMPO.

Twenty-five percent of our ships were deployed on the average for every day of last year. That is the highest since 1986. Both of those figures are 25 percent increases over our historical levels.

We have now decided to keep some of our older FFG's that we were going to retire in order to maintain our force structure and decrease the OPTEMPO, thereby increase the quality of life for our sailors and keep them home a little bit more.

We incidently have requested a supplemental for last year and this year in order to meet our commitments. We certainly thank you for your support. The Department of the Navy, including the Marine Corps, is about 20 percent of the DOD request.

We are concerned, of course, with readiness if the supplemental is not approved. Despite the pressures and requirements of world events, we are trying to make the Navy more cost efficient.

Last year we decommissioned 58 ships and submarines. Since 1989, we have decommissioned about 40 percent of our force. That is in concert with about a 44-percent decline in the TOA. Nonetheless, we are still trying to modernize our force.

Our goal is to build three DDG–51's a year in the long term. During the FyDP-up, it is about 2.7. The SSN–23 is in this year's budget. CVN–76 was in last year's budget and approved. The new attack submarine we will begin in 1998.

The F/A–18E and F is central to our carrier air wings. The LPD–17 we will start in 1998 and the LHD–7 and 01, and the V–22, of course, in 1997. It is necessary if we are to maneuver from the sea.

Balancing the Navy's requirements is like trying to balance a three-legged stool; readiness, recapitalization, and force structure. If you cut readiness, you cannot do the job today. If you cut force structure, you also have to decide what you cannot do tomorrow. If you cut modernization, then you need to decide what you cannot do 15 years from now.

Our commitment is to keep the Navy balanced and ready, affordable, executable, and capable. We intend to be early, flexible, mobile, sustainable, and independent of host nations's support, except for the United States of America.

Thank you very much, sir.

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COMMITTEE

STATEMENT OF

VICE ADMIRAL T. JOSEPH LOPEZ
DEPUTY CHIEF OF NAVAL OPERATIONS
RESOURCES, WARFARE REQUIREMENTS AND ASSESSMENTS

BEFORE THE
HOUSE NATIONAL SECURITY COMMITTEE
SUBCOMMITTEE ON PROCUREMENT
AND SCIENCE & TECHNOLOGY

MARCH 7,1995

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HOUSE NATIONAL SECURITY
COMMITTEE

Mr. Chairman, distinguished members of the National Security Committee, thank you for this opportunity to appear before you to discuss our modernization budget request.

In the 1980's the industrial might of our free market was used to match and exceed the military build-up of the Soviet Union in the exercise of what the ancient Chinese warrior-philosopher Sun Tzu called supreme excellence. In 2500 BC, he wrote: "To fight and conquer in all your battles is not supreme excellence; supreme excellence consists in breaking the enemy's resistance without fighting." In other words, supreme excellence is war prevention. In meeting the Soviet threat, our nation built a military that demonstrated "supreme excellence" by forward deploying Soldiers, Sailors, Airmen and Marines in tanks, aircraft, ships and submarines all over the world to show the Soviet Union and the world that we would not yield to forces hostile to freedom and democracy.

As we prepare to move into the 21st Century the forces needed to continue to prevent conflict have adjusted. We have made necessary but difficult choices. Our understanding of the future is called "Forward...From the Sea." As we look to the future we see a very chaotic world. In this world of turmoil where 80% of the world's population live within 200 miles of the world's coasts, an area we refer to as the "littoral," we see aggression by regional powers as the chief danger.. In response to this threat, the Department of Defense and Joint Staff have crafted a National Military strategy which calls for us to be prepared to face two hostile region powers at nearly the same time, fight them if necessary and win. To win two nearly simultaneous Major Regional Conflicts and maintain forward presence, the Bottom-Up Review concluded that the United States needs 346 ships, including 12 aircraft carriers and 11 carrier airwings, and three Marine Corps Expeditionary Forces.

Since the demise of the Soviet Union marked by the fall of the Berlin Wall in 1989, the United States Navy has moved swiftly to restructure itself. We had built a 600(nearly)-ship Navy and maintained an infrastructure that could support twice that number of ships. It was the right time to down-size. And we did. From our peak in 1987 to now, we have reduced the number of ships by 42%, our aircraft by 31%, our uniformed personnel by 33%, our infrastructure by 25% and our civilian workforce by 35% . In 1994 alone, we have decommissioned 65 ships and 13 submarines. All this has allowed us to operate our Navy and begin to modernize even though the

Department of Navy's overall TOA by has been reduced 48%. As every successful business in the United States has done, we have reduced overhead, shed inefficient outdated facilities, streamlined processes, and retained only the most capable facilities. This has not been easy nor enjoyable, but we did this because strategic circumstances had changed making it both necessary and acceptable. This restructuring or downsizing is almost over and now is time to build for the future.

Our first strategic priority remains constant --to prevent war. This requires naval forces to be engaged in forward areas, with the objectives of *preventing conflict* and *controlling crises* with flexible, highly capable forces. It is recognized that the overseas presence needed to obtain the above objectives can impose requirements for naval forces that exceed those needed to win two major region conflicts (2 MRCs).

Last year 52% of our ships were underway, the highest levels since 1975--the first year we started keeping those statistics--and 25% were forward deployed, the highest since 1986. This situation required us to operate at levels higher than those used in the Bottom-Up Review to determine force size and resulted in our decision to keep FFGs in commission beyond their planned decommissioning dates to maintain needed force structure and to allow our people time at home port with their families.

Although we plan and budget to operate primarily in three theaters, in 1994 we have effectively operated in seven: Cuba, Haiti, Red Sea/Arabian Gulf, Adriatic, North West Pacific, Indian Ocean, and Caribbean Sea. The supplemental needed to pay for these unplanned operations is now being considered by the Congress. If the supplemental can not be passed the Navy must stop yard service craft maintenance and defer a carrier overhaul and two submarine overhauls. Additional actions affecting readiness will have to be taken.

The supplemental issue illustrates the reality of declining resources. Fewer dollars are available to modernize and ensure future readiness because we must ensure our current capabilities. We have reduced ship procurement rates by 72% and aircraft procurements by 70%. While this situation has not adversely impacted the readiness of today's force, in our planning we recognized that if we do not modernize at a higher rate we ultimately place future readiness at risk. We acknowledge that the downward trend in procurement cannot continue. Funding of the

supplemental will allow us to fix our immediate problems without impacting further our procurements plans.

The reality of declining resources has us examining everything we do in order to realize savings. This effort includes five elements-- affordable modernization, joint system development, properly sizing our infrastructure, acquisition reform and an industrial base policy.

Affordable modernization. Scarce resources will not support large numbers and a wide variety of systems. Our FY 1996 budget request includes selected investments to update our most capable systems. For instance, we are improving our air launched standoff missile, SLAM, by doubling its performance and enhancing its survivability for a fraction of the cost of a new weapon system. We are compensating for the retirement of our strike A-6 aircraft by upgrading our fleet of F-14 aircraft with a precision (JDAM) ground attack capability that will complement the F/A-18 and make our overall striking capability greater than our previous airwings. We are developing new systems where we need improved capability such as the SSN 23, New Attack Submarine, DDG 51, F/A-18, and V-22.

Joint Systems Development. We are working closely with other Services to jointly develop multi-mission aircraft and weapon systems that will serve as force multipliers while meeting the requirements of more than one Service. In weapons developments this includes the Joint Direct Attack Munitions (JDAM), and Joint Standoff Weapon (JSOW). The Joint Advanced Strike Technology (JAST) program is a major effort to develop and produce the next generation of strike aircraft and weapon systems for the Air Force, Navy and Marine Corps. The Joint Primary Aircraft Training System (JPATS) is our commitment to procure identical airframes, simulators and logistics support with the Air Force to provide worthwhile primary flight training.

Infrastructure Downsizing. As indicated before, our downsizing is almost complete. However, we recognize the continuing need to size our laboratories, depots, and warfare development and training centers. Through consolidation and the BRAC process, we will reduce

infrastructure that is no longer needed to support a smaller, but more capable Navy/Marine Corps force.

Industrial Base Policy. We recognize that we can no longer support a completely separate industrial base. However, we are concerned with those unique segments of the industrial base that has no private sector counterpart, such as nuclear shipbuilding, strategic ballistic missile technology, warship design and construction.

The submarine industrial base remains a real concern. The Bottom-up Review concluded that a gap in production between the SSN 22 and the New Attack Submarine entails significant risks, and that SSN 23 should be constructed at the Groton shipyard to bridge the production gap. This will ensure that we maintain two nuclear capable shipyards and sustain the highly specialized nuclear vendor base.

PROGRAM HIGHLIGHTS

SCIENCE AND TECHNOLOGY HIGHLIGHTS

It is paramount that we retain our ability to maintain a technological warfighting edge. Long term, our investments in S&T ensures we maintain the technological edge while reducing the costs of future material and systems. It is focused on naval capabilities both to warfighting requirement and to take advantage of leaps in technology .

The FY 1996 RDT&E budget request of $8.2B includes both science and technology and research and development for the systems essential to our modernization strategy and demonstrates our commitment to remain at the forefront of science and technology. The most significant RDT&E efforts in FY 1996 are New Attack Submarine, Cooperative Engagement Capability (CEC), F/A-18E/F, and Ship Self-Defense.

SHIPS AND SUBMARINES

SEAWOLF is the most technologically advanced submarine ever built. Although the Soviet Union has dissolved, Russia has some submarines as stealthy as ours and several more on the way. In order to maintain our superiority and bridge the transition period when the New Attack Submarine (NSSN) will be ready for production, we need to build the third SEAWOLF, SSN 23. There is a continuing critical need for nuclear submarines. The Bottom - Up Review requires a force level of 45-55 SSNs. The New Attack Submarine will have the latest technologies at nearly the same cost as LOS ANGELES (SSN-668I) Class submarines. The plan calls for production to start in FY 1998 at the Groton shipyard. Cost reduction initiatives, such as the state-of-the-art Computer Aided Three-dimensional Interactive Application (CATIA), Commercial Off the Shelf (COTS) and Non-developmental items (NDI) are being incorporated with the program.

AIRCRAFT CARRIERS with their flexible multi-mission airwings are and will continue to be the centerpiece of the United States Navy. To maintain a full time carrier presence in the primary three Areas of Responsibility (AOR) would require 15 carriers. The Bottom-Up Review concluded that the risk with 12 (11 active + 1 operational reserve) is prudent for now to meet warfighting and tethered overseas presence requirements. We are presently conducting a study of alternative aircraft carrier concepts for the 21st Century that will develop and assess a range of affordable technologies for CVN 77 and other designs to support sea-based tactical aviation.

Our latest flight of the ARLEIGH BURKE (DDG-51) class destroyer is the new and highly capable, multi-mission surface combatant that combines the state-of-the-art air and self defense capabilities, increased capacity for vertical launched land attack cruise missiles, and significantly improved damage control capabilities. To respond to littoral warfighting requirements a dual helicopter hangar and organic LAMPS MKIII capability will be incorporated into the Flight IIA of the class. In order to sustain minimum force levels required by the Defense Planning Guidance (DPG) and sustain the surface combatant industrial base, we need to procure

2.7 DDG-51's per year near term, and average 3 per year over the long term to maintain a minimum force level of 105.

21st CENTURY SURFACE COMBATANT (SC 21)

In January the Defense Acquisition Board (DAB) approved the Navy's plan to do conceptual studies for surface combatants in the 2007 to 2020 time period. We will look at mission requirements, compare alternative ship designs, and evaluate the relative effectiveness of these alternatives in joint scenarios. Although it is too early to know what will come, we currently envision that a family of ships will emerge, not just a single combatant.

SHIP SELF DEFENSE

High on the Navy's priority list is Ship Self Defense. It will provide defense capabilities against anti-ship cruise missiles. Key elements are improvements to the Phalanx Close in Weapon System, buying the Rolling Airframe Missile, and development of the Evolved Sea Sparrow Missile.

THEATER BALLISTIC MISSILE DEFENSE (TBMD).

To leverage off the tremendous capabilities of the AEGIS ships and weapon system we are developing our ability to destroy theater ballistic missiles like the SCUD that were so prominent in DESERT STORM. We have the platform, the radar system, the connectivity, the weapon, and the logistics support already in place to provide this important capability anywhere in the world where a ship can go. We are concentrating on developing our area defense (lower tier) to protect debarkation ports, fleet concentrations in littoral operations and coastal operations and ultimately to protect entire regions through seabased upper tier.

AMPHIBIOUS SHIPS

LPD-17 -AMPHIBIOUS TRANSPORT DOCK

LPD-17 is our top priority in the next generation of amphibious lift ship to replace LSD 36, LK A 113 and LST 1179 class ships. Designed with improved ship survivability features it

will have a collective protection system allowing it to operate in a hostile chemical/biological warfare environment. and a vertical launch missile suite for self protection. We will begin procuring the first of the class in FY 98.

LHD-7

7 LHDs and 5 LHAs are the required centerpieces in 12 tactically flexible, deploying Amphibious Ready Groups (ARGS). They embark, deploy and land elements of a Marine landing force in an amphibious assault using helicopters, landing craft, and amphibious vehicles. LHD-7 is funded in FY 2001 to sustain 12 ARGs and maintain the required lift capability for 2.5 Marine Expeditionary Brigades.

COASTAL MINEHUNTER SHIPS-MHC 51

MHC-51 class is a coastal minehunter ship designed with a glass reinforced hull with reduced acoustic and magnetic signatures to operate for short periods to find and destroy mines. This is a 12 ship program divided between two shipbuilders; Intermarine USA (IMUSA) of Savannah, GA an Italian owned company with eight ships, and Avondale Industries (AII) of New Orleans, LA with four ships.

WEAPON SYSTEMS

JOINT WEAPONS

We are continuing in the development of precision guided weapons to improve our battlefield accuracy and increased standoff capability to lesson the risks to our warfighters with the development of the Joint Direct Attack Munition (JDAM), and the Joint Standoff Weapon (JSOW). They will provide us the necessary precision weapons mix to meet our requirement into the 21st century.

TRIDENT II (D-5) MISSILE

Presidential Decision Directive 30 directed a force structure of 14 D5 SSBNs. This will require the backfit of four Trident I (C4) SSBNs and the additional purchase of 97 D5 missiles. The first two SSBNs will start conversion in FY 2000 and 2001.

SLAM-ER

The Standoff Land Attack Missile-Expanded Response is a retrofit program to the existing inventory of the Navy's only air-launched standoff missile that provides precision strike against fixed, above ground, high value land targets and ships in port. It will provide significant survivability and performance improvements.

NAVAL AVIATION PROGRAMS

GENERAL

Our Aircraft Procurement provides Naval Forces with aircraft to project power from the sea, gain air superiority for and support enabling forces ashore, and to engage in sustained combat operations in support of other land or sea forces. Aircraft force structure and modernization have focused on multi-mission aircraft to meet regional, as well as dual MRC conflicts. Despite significant downsizing in A/C numbers the average age of all Naval aircraft will continue to increase to 17.4 years by Fiscal Year 2000. The Navy APN plan addresses force level requirements of our Navy and Marine active and reserve squadrons. It initiates plans to cover the USAF EF-111A EW requirements with refurbished Navy EA-6Bs. It initiates funding late in the FYDP for VERTREP replacement helicopters. It also initiates studies to determine a single follow-on airframe to replace the E-2, C-2, S-3 and an airframe to replace the Navy H-60 series and H-46.

The F/A-18 C/D has reached its growth limits, having inadequate volume within the airframe to accommodate additional new weapons and systems that are currently under

development. Limitations extend to electrical power and cooling capacity. Procurement will be terminated in Fiscal Year 1996. In order to modernize tactical naval and provide modern aircraft that ensures maximum availability of high technology weapons and sensors, and provides commonality with current avionics, software and weapons, the Navy intends to procure the F/A-18E/F. Compared to the F/A-18 C/D, the E/F will provide:

- increased internal fuel capacity with increased range
- increased carrier recovery payload and flexibility
- increased engine thrust
- increased survivability
- increased growth potential
- 90% commonality with F/A-18C/D avionics, software and weapon carriage

The F/A-18E/F will complement future JAST concepts and provide the majority of strike/fighter assets on the carrier, and will allow the Navy to neck down from 3 tactical aircraft types to 2. It will retain and improve upon all F/A-18C/D day and night strike/fighter capabilities. The program is on cost, on schedule, with the first flight set for December 1995.

The JAST program was initiated to serve as the Department of Defense's focal point for defining future strike systems. It will identify, promote and demonstrate key leveraging technologies for the reduction in life cycle cost (LCC) of each of the services' next generation strike-fighter aircraft, while maintaining a technological lead over potential adversaries. JAST follow-on aircraft must complement the F/A-18E/F and be a major contributing factor in the first phase of any conflict. It must also be able to remain a significant warfighting contributor during the remainder of a conflict. Contracts were awarded in December 1994 for concept definition, weapons systems design research, and preparation for the flight demonstration phase. As a demonstration program designed to reduce risk and cost in the development and production of our next generation strike-fighter aircraft, we are committed to JAST as the key to fulfill both the Navy's requirement for a "first day survivable, stand-alone, strike-fighter", and the Marine Corps's requirement to replace their AV-8's and F/A-18's with ASTOVL.

In order to compensate for the loss of A-6 strike capabilities, we will continue to upgrade our fleet of F-14 aircraft with a precision (JDAM) ground attack capability. Although our carriers will deploy with a mix of 36 F/A-18 and 14 F-14 strike aircraft, the overall striking capability will be greater than of the previous F-14, F/A-18, A-6 airwing. While an even more capable air-ground upgrade to the F-14 is desirable, it is currently unaffordable. We have initiated a cost and operational effectiveness assessment to determine the most cost-effective precision strike capability for the F-14. Upon completion of the COEA review, a report will be submitted to Congress stating the Navy's position.

The replacement of the aging CH-46 helicopter remains the Department's highest aviation priority for the Marine Corps. In order to conduct effective Operational Maneuver From The Sea (OMFTS), amphibious forces must be able to project forces deep inland from the sea, and continue to maneuver flexibly once ashore. The V-22 will replace both the CH-46E and CH-53D, providing increased passenger and payload capacity, increased speed, range and maneuverability, increased survivability and increased growth potential. Near term program objectives are 425 for USMC and 50 for USSOCOM, with the Navy potentially procuring 48. Program Decision Memorandum IV of December 1994 defined integrated V-22 development and production to meet USMC and USSOCOM requirements in the FYDP.

The EA-6B remains the premier tactical jamming system in the world. It is projected to be in inventory until 2015. To fill the gap in capability created by cancellation of the ADVCAP program, ICAP II aircraft will require an upgrade. We will save money by restructuring our current programs, and development of a cogent ICAP II upgrade program is complete and is part of this budget submission. This upgrade is planned to begin in 1998. In addition, the Secretary of Defense has directed the assumption of the EF-111A mission by the EA-6B.

The Joint Primary Aircraft Training System (JPATS) will overcome the shortcomings of both the Navy's T-34 and Air Force T-37 trainers through improved training effectiveness and safety improvements. It is a total training system, including aircraft, simulators, ground based training systems, and logistics support, which will provide entry level training for student

aviators so they reach a level of proficiency necessary for transition into specialized advanced flight training tracks. We are totally committed to procuring identical airframes with the Air Force, which will provide worthwhile joint primary training as long as service unique objectives are met.

CONCLUSION

We have a strategy that will maintain a highly capable, technologically advanced Naval force. Over the past 5 years we have made some difficult choices to streamline our Navy with dramatic cuts to procurement to procurement and infrastructure to match the drawdown in manpower and force structure. Our future depends on maintaining the balance of three funding choices: readiness, force structure and modernization. Current demands prohibit readiness reductions and given today's world wide commitments no further force structure reductions are planned. Moreover, we are committed to provide our people modern, highly capable platforms and weapons systems. This mix of platforms and weapons must be stated for credible combat power to first keep the fight from starting and to quickly win if the fight is required. Because technology and increased capability often make our future systems more expensive, we must ensure the right number and mix of precision weapons and multi-mission platforms are available to meet our requirements. This risk to our strategy is higher if a continuing decline in resources prevents modernization and procurement as our smaller force structure grows older. We recognize that our modernization plan alone may not be enough to assure future readiness and to meet future commitments. Outyear budgets will require real growth if we are to fully modernize our naval force to defend our national interests anywhere in the world.

Mr. HUNTER. Thank you, Admiral. General Wilhelm.

STATEMENT OF LT. GEN. CHARLES E. WILHELM, COMMANDING GENERAL, MARINE CORPS COMBAT DEVELOPMENT COMMAND

General WILHELM. Mr. Chairman, distinguished members of the committees, good morning. I appreciate the opportunity to appear before you today to discuss the Marine Corps procurement and research and development programs.

The Marine Corps, as you all know, is first and foremost about marines. Our budget and our programs for fiscal year 1996 support a total force of 174,000 active and 42,000 reserve Marines. They also provide for the maintenance of peak combat readiness among those forces worldwide.

I think the quality of that readiness was demonstrated clearly just last week when marines from the First Marine Expeditionary Force, out of Camp Pendleton, conducted a nearly flawless amphibious withdrawal after covering the evacuation of U.N. forces from Somalia.

Our programs and our budget also provide funds, in some cases quite honestly long overdue, to attend to some of the more pressing quality-of-life needs of both our single and our married marines.

Trying to maintain a peak level of funding to support readiness and to attend to the quality of life needs of our Marines, during these times of unparalleled high OPTEMPO, really has placed some stressing demands on our procurement and research and development accounts. In fact, those two accounts are severely underfunded.

I would point out in fact that for the past 3 years our procurement account has been funded at its lowest level since 1972. As a result, we have been unable to address some of the most stressing modernization needs confronting the Corps. If we do not address these modernization needs soon, we run a very, very real risk of dulling our combat edge.

I think that tactical mobility is an excellent case in point. I would cite three examples springboarding off of Mr. Weldon's opening comment. The CH–46 sea-night helicopter is our primary assault support or troop carrying helicopter.

Members of the committees, I first saw that airplane when I was a first lieutenant, fairly goodlooking in Viet Nam in 1966. I first laid eyes on the assault amphibian vehicle, the Amtrak, which you may have seen on CNN evacuating Lt. Gen. Tony Zeni and his troops from 1–MEF from Mogadishu last week, when I was a captain in 1971.

Our motor transport fleet, our 5-ton trucks which serve both as the prime movers for our direct support and general support artillery and which are truly the workhorses of Marine logistics are now in their 16th year of service.

True enough, we have programs on the drawing boards to either replace or rejuvenate these systems. In the case of the CH–46 we have the V–22 Osprey which is proceeding nicely.

In the case of our Amtrak we have the advanced assault amphibian vehicle. In the case of our 5-ton truck fleet we have an ambitious remanufacturing program. I would hasten to add that none

of these programs will deliver new or rebuilt combat systems until after the turn of the century.

In its last posture statement the Commandant used the terms "honor, courage and commitment" to describe Marines. If he had asked me I would have asked him to include the term "frugal." As an institution we are proud of the thrifty way in which we have managed the funds that Congress has entrusted to us over time.

Who, but a marine, would manage airplanes and trucks in the same way? I will tell you in a very real sense that is what we intend to do. Our AV–8B carrier attack aircraft will soon enter a remanufacturing program, as will our fleet of 5-ton trucks.

As a result of these programs, to use the jargon of a used car salesman, we will be able to legally roll their odometers back to zero and start their surface lives all over again at a substantial savings.

In the case of the AV8 the cost of a remanufactured aircraft is 77 percent of new production. That would have really been good news at 23 percent. We will realize a 30-percent savings by remanufacturing our truck fleet.

We also take pride in the fact that for a little bit less than 6 percent of the total defense budget, on average, we provide 18 percent of the active combat divisions, 11 percent of the reserve divisions, and 15 percent of tactical aviation.

We are grateful to Congress for the support that you have provided us over the years. I want to assure you this morning that the Marines of today are just as committed as those who have gone before to providing the American people and the Congress the very highest return possible on each dollar in defense.

Thank you very much. I look forward to your questions that will follow.

PREPARED STATEMENT OF LIEUTENANT GENERAL CHARLES E. WILHELM

COMMANDING GENERAL, MARINE CORPS COMBAT DEVELOPMENT COMMAND

INTRODUCTION

Mr. Chairman, and distinguished members of the Committee, I thank you for the opportunity to present our fiscal year 1996 budget request for the Marine Corps ground portion of the Navy Research, Development, Test and Evaluation (RDT&E,N) and the Procurement, Marine Corps (PMC) appropriations.

The Cold War may be over but the need for American leadership and commensurate military capability continues. Deterrence of aggression, peacekeeping, containment of regional conflicts, assistance in international drug interdiction, humanitarian assistance, and domestic emergency relief, are continuing demands. The Marine Corps has been mandated by Congress to be the most ready when the Nation generally is least ready and the Marine Corps is proud to be our Nation's "911 force" for global response. The Marine Corps is an expeditionary force-in-readiness and provides a unique capability that combines air, land, and naval forces from the sea--the Marine Air-Ground Task Force. In preparing the Marine Corps for its future missions, we recognize the need to retain capability and credibility across the full spectrum of deployments and possible contingencies by striving to maintain the combat advantage generated by superior mobility, flexibility, lethality, and speed.

To retain the combat advantage and maintain a technological edge over potential adversaries, we must modernize our weapons, systems, and platforms. Otherwise, we will be unable to effectively and efficiently use our most important asset, the individual Marine, to meet global challenges. Declining resources present a serious challenge which has our undivided attention. We are determined to maximize our investment and development funds. The Marine Corps uses joint developments with the other services, and evaluates the weapons of allied nations, as a means of maximizing the leverage provided by scarce

R&D and PMC dollars. The Marine Corps does not enter into any weapons system development without first fully investigating the potential for a joint effort with the other services. Also, the Marine Corps optimizes the procurement budget by purchasing nondevelopmental items, whenever possible. Approximately 45% of the RDT&E,N ground allocation is dedicated to programs with joint applications and approximately 88% of PMC funding is allocated to joint or nondevelopmental programs. With extensive cooperation from the Navy, Army, and Air Force, particularly in their consideration of Marine Corps requirements during weapons design and development, our financial resources would still have to be significantly increased to achieve our current level of modernization. The Marine Corps has also been the beneficiary of many Department of Defense service-wide programs because of Congress' support and oversight.

We are acutely aware of the dangers and inefficiencies of not being able to communicate and share information with soldiers, seamen, and airmen in a joint environment. At the beginning stages of the acquisition process, the Marine Corps addresses interoperability with our sister Services. We ensure interoperability in voice and data communication by focusing on development, modification, review, and configuration management of data communications protocols and message standards employed in the Marine Corps and the other services. Interoperability is designed into each system and conformance tested prior to final Milestone III approval. For example, the acquisition and improvements of our Single-Channel Ground-Airborne Radio System, an extremely important and large program for both the Marine Corps and Army, proceeded through the Joint Program Office, led by the Army.

Also, the Marine Corps has joined the Army in developing and fielding several firepower systems. Most recently, the Marine Corps and Army developed the Pedestal Mounted Stinger, now called AVENGER. After revising its requirement for the AVENGER, the Army transferred 99 fire units to the Marine Corps. This will enable the Marine Corps to attain this important element of its low altitude air

defense requirement during FY 1995. Currently, the Marine Corps is developing the Short Range Assault Weapon (SRAW), called PREDATOR, which will be used to destroy enemy battle tanks equipped with explosive reactive armor. In accordance with Congressional direction, the Army will expand this weapon's capability by using it with its Multi-Purpose Individual Munition, which is also in development.

Additionally, the Marine Corps has several joint efforts in mine countermeasures which are largely outgrowths of our Desert Storm experience. For example, to defeat land mines, the Marine Corps and Army are developing the Explosive Stand-off Mine Breacher, the Combat Breacher Vehicle, and the Anti-Personnel Obstacle Breaching System. In coordination with the Navy, the Marine Corps is developing the Distributed Explosive Mine Neutralization System to provide needed mine countermeasure capabilities in crucial surf and craft landing zones.

As we concentrate on achieving a high return for our investment dollars, notable trends in our fiscal year 1996 budget requests include:

- As the foundation for success across all other warfare areas, Command, Control, Communications, Computers, and Intelligence (C4I) has been allocated OVER THIRTY-FIVE PERCENT of our procurement funds. This includes significant investments in radios, intelligence support equipment, aviation and artillery command and control systems, and position location and navigation systems. Additionally, TWENTY-THREE PERCENT of our research and development funds focus on these areas.

- Almost THIRTEEN PERCENT of procurement funding supports modifications and product improvements to enhance the performance of current equipment and systems. These are high leverage efforts to address deficiencies and integrate new technology into proven performers like the

Light Armored Vehicle. The allocation of TWENTY-TWO PERCENT of our R&D to similar efforts will help us examine future capability upgrades.

- The remainder of this statement will discuss in detail the Research, Development, Test and Evaluation (RDT&E,N) and Procurement, Marine Corps (PMC) appropriations.

MARINE CORPS GROUND ALLOCATION OF RDT&E,N

In fiscal year 1995, Congress authorized and appropriated $184 million for research and development of Marine Corps ground combat systems and equipment. We are requesting that you approve $204 million in fiscal year 1996.

The fiscal year 1996 Marine Corps ground combat research and development request concentrates on (1) development of a future replacement for and upgrade to our current assault amphibious vehicle, (2) development of future replacements for and upgrades to our short range anti-tank capability, our direct/general support howitzer, and our medium tactical wheeled vehicle fleet, and (3) maintaining and improving joint interoperability through our communications, command, control and intelligence systems. We are participating in joint efforts and plan to take advantage of development efforts by the other Services, wherever possible, for weapons, vehicles, computers and software systems.

The Marine Corps is requesting $32.4 million in fiscal year 1996 for the Advanced Amphibious Assault Vehicle (AAAV) program, which continues to be our number one ground combat priority. The Concept Exploration Phase of this program is complete. All operational effectiveness analyses and war games which have been conducted have clearly indicated that the Advanced Amphibious Assault Vehicle (AAAV) is the required solution for our ground mobility and ship-to-objective needs. The AAAV's inherent multi-mission capabilities make it the best answer for supporting forward deployed naval expeditionary forces across the full spectrum of potential operations in the world's littorals.

Both the United Defense Limited Partnership (UDLP) (formerly FMC and BMY) and General Dynamics Land Systems (GDLS) Advanced Amphibious Assault Vehicle (AAAV) hydro-dynamic test rigs have successfully demonstrated water speeds in excess of 30 knots. Each contractor is completing

technical risk-reducing experiments, and initiating testing of full-scale AAAV automotive test rigs. These activities will be completed by the end of fiscal year 1995. In addition, work has commenced to construct weapon stations that will be tested in FY 1996. The Assistant Secretary of the Navy's (Research, Development and Acquisition) independent technical assessment team (Office of Naval Research) has reaffirmed the technical feasibility of AAAV and has recommended that this program proceed with development of a full-scale prototype vehicle.

Current plans are to conduct the Milestone I review of the AAAV during March 1995. During the Demonstration and Validation Contract Phase starting in fiscal year 1996, the Marine Corps plans to award a contract to a single competitor for fabrication of a full system prototype.

To replace aging weapons and combat service support systems, which are key to the battlefield effectiveness and survivability of the individual Marine, we are requesting $31.5 million for rapid engineering and manufacturing development of the Short Range Anti-tank Weapon (SRAW) program now titled PREDATOR. PREDATOR will provide the individual Soldier or Marine a disposable, fire and forget main battle tank killer capable of soft-launch for firing from within enclosed spaces.

Additionally, $10.9 million is requested for the Lightweight 155 millimeter towed howitzer to replace the M-198 Howitzer currently experiencing costly, readiness degrading metal fatigue cracks. In accordance with Congressional guidance, a Joint Operational Requirement Document will be signed with the Army in fiscal year 1995. This fiscal year 1996 request funds the lease and support of a howitzer from all developers for a competitive shoot-off and government down-selection to a single prototype for engineering completion.

Finally, we are requesting $2.4 million for the Medium Tactical Vehicle Replacement (MTVR) program. This funds engineering development of prototypes to test for remanufacture of the current fleet of 5-ton wheeled vehicles which are completing their service life prior to planned replacement.

We are continuing investments in our amphibious science and technology (S&T) base by transitioning mature technologies from exploratory development to advanced technology demonstrations in order to evaluate their Fleet Marine Force operational applicability. Our fiscal year 1996 request includes $17.6 million for exploratory development and $25.9 million for advanced technology demonstrations. These amphibious S&T efforts involve mine neutralization, obstacle detection, weaponry, battlefield electronic support, and engine propulsion technology. Joint advanced technology demonstrations are requested in stand-off mine detection, tactical directed energy warfare, and mine countermeasures in the surf zone and craft landing zone.

Continued Intelligence improvements in data collection, fusion, analysis and dissemination are requested for the Intelligence Analysis System ($2.3 million), and the Tactical Electronic Reconnaissance Processing and Evaluation System ($2.5 million).

Funds are requested to continue improvements in air defense and aviation command and control systems. These improvements will support tactical missile defense and enhanced mobility. We are requesting $8.1 million for Advanced Tactical Air Command Central (ATACC), $5.8 million for Air Defense Missile Systems Improvements, and $5.1 million for software improvements to our Tactical Air Operations Module (TAOM).

To support automated ground command and control, we are requesting $3.7 million for the multi-service Advanced Field Artillery Tactical Data System (AFATDS).

A continuing communications, and command and control improvement includes $1.7 million for the Data Automated Communications Terminal. This level of funding will support transition of this program from the Marine Enhancement Program and will enable us to analyze off-the-shelf hardware for handheld data burst transmission.

Interoperability and systems integration improvements are addressed with a request for $4.5 million for Marine Corps Air Ground Task Force (Systems Engineering and Integration). This effort provides an integrated architecture for joint service global command and control systems software and hardware. Additionally, we are requesting $1.4 million for Joint Interoperability of Tactical Command and Control Systems (JINTACCS) and $3.4 million for the Tactical System Intra/Interoperability Program (TACSIIP). These systems integration and interoperability efforts are being closely coordinated to complete joint tactical air information data links for integrated theater missile defense and NATO interoperability efforts.

Our Marine Corps Program Wide Support request contains $2.3 million for Marine Corps Studies and Analyses, such as Cost and Operational Effectiveness Analyses and Mission Area Analyses. It also contains $1.9 million for the Marine Corps Operational Test & Evaluation Activity and $1.7 million for the Human Resources Management and Forecasting project.

The fiscal year 1996 Marine Corps ground combat research and development request provides for cost effective attainment of tactically and technically superior, multi-service operational combat capabilities. Your continued support of the Marine Corps' development efforts is essential to the accomplishment of our mission in a constantly changing and extraordinarily demanding international security environment.

PROCUREMENT, MARINE CORPS

In fiscal year 1995 Congress appropriated $418.2 million for Marine Corps procurement programs and $135.3 million under the new Navy/Marine Corps Ammunition Appropriation. The fiscal year 1996 request of $474.1 million will permit us to focus only on the most essential modernization and sustainability requirements.

Budget Activity 1, Ammunition

With the FY 1996 budget request of $110.9 million the Marine Corps will still be able to conduct required training in FY 1996 and maintain required readiness levels. This will be accomplished by drawing down the war reserve inventory. However, the Marine Corps can only maintain this level of readiness through FY 1997.

Budget Activity 2 - Weapons and Tracked Combat Vehicles

The Marine Corps' purchase of modification kits and engineering changes will extend the combat readiness of the Assault Amphibious Vehicle (AAV7A1) until the end of its service life. These modifications provide significant improvements in vehicle reliability, combat capability, and operational safety.

The fiscal year 1996 request for the Light Armored Vehicle (LAV) will allow us to implement Mobility Block Enhancements as well as continue the procurement of thermal sights. These mobility enhancements include an improved brake system, image intensification periscopes, improved engine durability, better fuel economy, and improved flotation.

Enhancements to our M1A1 Main Battle Tank continue with the procurement of the Self Cleaning Air Filter (SCAF). SCAF increases time between equipment failure by pre-cleaning the air entering the engine air filter. During Fiscal Year 1994 the Marine corps received 50 M1A1 tanks from the Army to alleviate immediate training and operational shortfalls. In accordance with Congressional direction, the

Marine Corps will receive an additional 132 M1A1 tanks from the Army during Fiscal Year 1995 and Fiscal Year 1996. These tanks require extensive modernization, upgrade, and repair to conform to the current configuration of the Marine Corps tank fleet. Approximately $12 million was internally realigned from other Marine Corps programs to fund these upgrades. This realignment will stretch out completion of other weapon and tracked combat vehicle programs.

Budget Activity 3 - Guided Missiles and Equipment

The Marine Corps accelerated its procurement of the Avenger to try to minimize DOD's liability after the Army terminated its portion of the multiyear contract. This effort, along with the 99 fire units DOD directed the Army to transfer to the Marine Corps, allowed us to attain our requirement during FY 1995. Our fiscal year 1996 request will procure passive sensors, weapons direction units and training simulators.

The Avenger is a lightweight, highly mobile, gun-missile hybrid mounted on a High Mobility Multi-purpose Wheeled Vehicle (HMMWV). Using state of the art technology in Forward Looking Infra-Red and Laser Range Finder systems, the Avenger revolutionizes the concept of operation for Stinger gunners by providing eight ready-to-fire missiles for a rapid shoot-on-the-move, day/night, adverse weather capability.

The procurement of modification kits, engineering change proposals, and components in FY 1996 will continue to modernize both the HAWK and TOW Missile systems providing greater reliability and improved target acquisition, while ensuring safety and reducing overall training costs.

Budget Activity 4 - Communications and Electronics Equipment

The Marine Corps continues the procurement of Communication, Command and Control (C3) assets to ensure that we have the critical capability to command and control forces on the modern

battlefield. In fiscal year 1996 we will continue to modernize existing equipment and procure new systems, stressing joint service and combined forces interoperability.

The Marine Corps is continuing its participation in the Joint Tactical Information Distribution System (JTIDS), and the Advanced Field Artillery Tactical Data System (AFATDS).

The Joint Tactical Information Distribution System (JTIDS) provides a high capacity, jam-resistant, secure digital communications capability for tactical command and control and sensor host platforms. The Marine Corps is working in close coordination with the program office to maintain the momentum of this important program.

The Advanced Field Artillery Tactical Data System (AFATDS) will provide digital automated command and control for fire support coordination and tactical fire direction functions to all Fire Support Coordination Centers, Fire Direction Centers, Direct Air Support Centers, and Supporting Arms Coordination Centers. It will enhance fire support capabilities and improve coordination of surface, naval, and close air support systems and agencies operating in support of the Marine Air Ground Task Force. The fiscal year 1996 request will increase our attainment level to 76 percent of the acquisition objective.

In FY 1996 we begin procurement of the Tactical Combat Operations (TCO) system. This procurement covers the microcomputer needs for both TCO and the Data Automated Communications Terminal (DACT). Together, these programs provide digital mapping, messaging, overlay, and related capabilities enabling Marines to share a common picture of the battlefield throughout the Marine Air Ground Task Force and with supporting Navy and Coast Guard counterparts.

The Marine Enhancement Program will continue in FY 1996. This program provides funding for low visibility, low cost items. It focuses on equipment which will benefit the individual Marine by reducing the load, increasing survivability, enhancing safety and improving combat effectiveness. Fiscal Year 1996 funding will be used to procure the lightweight Medium Machine Gun Tripod which will lighten the load of the machinegun team by more than half, and the Tactical Hand Held Radio (THHR) which will replace obsolete, non-secure radios currently used by small units during combat and other contingency operations.

The procurement of Tactical Remote Sensor (TRSS) equipment will continue to enhance the Intelligence Support Equipment program. The TRSS detects the presence of physical disturbances caused by movements within a pre-designated area of surveillance. Coded signals are transmitted or relayed to a monitoring station. The monitoring station provides analysis of the data to determine type, location, direction of travel, speed, number, and size of detected activity. The fiscal year 1996 request will enable the Marine Corps to fully attain its TRSS requirement.

Our fiscal year 1996 request for additional AN/PVS-7B Night Vision Goggles will increase our inventory to 96 percent of requirement. This third generation image intensifying system is capable of detecting a man-size target at 200 meters in starlight and 300 meters in moonlight. It is six ounces lighter than the older night vision goggle and three times as sensitive. The system also incorporates an automatic shut-off for protection from bright light and significantly improves our night-fighting capability.

We would like to thank you for the FY 1995 funding increases for the SINCGARS program. This increase, and the FY 1996 request, will bring our attainment level up to 88 percent for this highly reliable and very secure system which will be our primary means for command and control, including fire support, on today's battlefield

Other funding within this budget activity will continue the procurement of Manpack Radios, Advanced Tactical Air Command Central (ATACC), Automated Data Processing equipment, and essential Electronic and Mechanical Test equipment.

Budget Activity 5 - Support Vehicles

Fiscal Year 1996 funding will allow us to continue replacement of our aging commercial vehicles, fill out our trailer inventory and modify tactical vehicles to ensure safe operation. We will also procure modification kits to ensure that safe and reliable vehicles are available for both training and warfighting operations.

Budget Activity 6 - Engineer and Other Equipment

Fiscal year 1996 funding will allow us to continue to procure tactical support items such as military standard environmental control units, field medical equipment, DOD standard generators, and other equipment to support our weapons systems and improve the sustainability of the Fleet Marine Forces.

The $8 million Congressional plus-up in FY 1995, and the FY 1996 request for Special Training Devices, will allow us to procure 41 additional Indoor Simulated Marksmanship Trainer (ISMT) under the current contract, thereby decreasing the likelihood of new contract negotiations and associated cost increases. Procurement of additional systems will enable us to employ ISMT's interactive disc video and eye-safe lasers to achieve realistic, safe, and highly productive small arms training while avoiding numerous training costs, to include ammunition.

The Marine Corps is continuing to upgrade its antiquated telephone systems. The Telephone Switch Upgrade adds new capabilities such as voice mail, and data switching while the Fiber Optic Distribution System provides fiber optic cable systems to support the distribution of high speed data, imaging, and video systems on Marine Corps Bases. The Telephone Switch Replacement program replaces telephone switches that have become technologically obsolete and cannot be upgraded.

In compliance with Congressional and other physical security and antiterrorism directives the Marine Corps FY 1996 request for Physical Security Equipment will replace antiquated systems that are costly to maintain, upgrade security in neglected areas, save manpower through capital labor substitution and, decrease maintenance cost.

During fiscal year 1996 we will continue to replace obsolete garrison and material handling equipment as well as modernize our warehouses. Replacement has been scheduled on an as required basis as most items have been maintained beyond the life expectancies promulgated in DOD directives. The objectives of the storage and warehousing modernization program are to improve the utilization of storage space, manpower, and customer service, with the foremost goal of providing positive and timely support for Fleet Marine Force deployments.

Budget Activity 7 - Spares and Repair Parts

Funding in this budget activity will provide for reimbursement of the Defense Business Operations Fund (DBOF) for procurement of initial spares to support new equipment and systems being introduced into our inventory. Funding for replenishment spares to support critical low density equipment and weapon systems is also included.

Navy Funded Activities - Aviation Programs

Though aviation research, development, test, and evaluation and procurement for the Marine Corps are funded in Navy accounts, the aviation combat element is a unique and indispensable part of the Marine Air Ground Task Force. Accordingly, the following summary of key Marine Corps aviation programs is submitted as a part of this statement.

MV-22 (OSPREY). The MV-22 is the Marine Corps replacement for the aging CH-46E and CH-53D medium lift assault force. The MV-22 is a tiltrotor aircraft capable of carrying 24 combat equipped Marines or a 10,000-pound external load. Cruising at 250 knots with worldwide self-deployability (2,100 nautical miles with one inflight refueling), the V-22 will enhance rapid response and force closure. The MV-22 will be the cornerstone of the Corps assault support force in the 21st century. It will provide the Marine Air Ground Task Force with an assault support aircraft possessing the speed, endurance, combat radius, payload, and survivability needed to fight and win on tomorrow's battlefield. The latest COEA, which incorporated maneuver warfare on a joint battlefield, once again validated the MV-22 as the most cost and operationally effective alternative for the Marine Corps medium lift mission. The combination of speed, payload, combat radius, and survivability provide the capabilities needed to enhance maneuver warfare, minimize casualties, and maintain the technological and operational edge well into the 21st century. In August 1994, the Joint Requirements Oversight Council (JROC) found commonality between the Marine Corps medium lift requirement and USSOCOM requirement for a long range special operations

aircraft. In December 1994, the Office of the Secretary of Defense (OSD) approved the continued development and production of the baseline MV-22 and CV-22 variant aircraft to meet the common requirements of the Marine Corps and USSOCOM. The first Low Rate Initial Procurement (LRIP) lot of Marine MV-22 aircraft is scheduled for Long Lead funding in FY96 and procurement funding in FY97. Deliveries will begin in FY99 and be completed in FY23. MV-22 procurement remains the number one Marine Corps aviation acquisition priority.

AV-8B (HARRIER) Remanufacture. The AV-8B's Vertical/Short Take Off and Landing (V/STOL) design gives it the capability to operate from a variety of land- and sea-based areas. The AV-8B will remain in service until introduction of a replacement aircraft near 2010. Current production AV-8Bs are built to the radar night attack standard, which incorporates an improved engine, night warfighting capabilities, and the APG-65 multimode radar. The Marine Corps is pursuing a remanufacture program in which 72 of its older "day attack" aircraft would be rebuilt to the current radar/night attack standard at only 80 percent of the cost of a new aircraft. The MAGTF has limited organic artillery and tanks, and relies heavily on its complementary aviation assets to provide required fire support. The V/STOL capability of the AV-8B is well suited to meet the needs of expeditionary forces, both afloat and ashore. The addition of night attack and radar capabilities would allow the AV-8B to be responsive to the needs of the Marine Air Ground Task Force for expeditionary night and adverse weather offensive air support. Sixty older day *attack aircraft are* programmed to be remanufactured though FY00. Twelve additional aircraft are required to be remanufactured in FY01.

AH-1W (COBRA) Mid-Life Upgrade. The AH-1W 'Super Cobra' is a tandem seat, two place attack helicopter. The aircraft is capable of carrying a versatile mix of ordnance which includes: Hellfire, TOW, Sidewinder, Sidearm. 20mm turreted gun and assorted forward firing rockets and external ordnance. The aircraft missions include: Enroute escort and protection of troop carrying assault helicopters, landing zone

preparation and fire suppression, anti-armor and anti-helicopter defense, and command and control of supporting arms. The AH-1W is scheduled to remain in service until 2020. A three phase mid-life upgrade is planned Phase I of the upgrade is currently in progress. It includes installation of a Night Targeting Systems (NTS) into all aircraft, providing the aircraft with the ability to fight at night and in marginal or adverse weather. Phase II entails installation of the Integrated Weapons System which enables the aircraft to be fought equally from the front or back seat. Phase II corrects longstanding safety deficiencies by digitizing the cockpit, thereby reducing pilot workload and improving battlefield situational awareness. Installation of a four-blade main rotor system to replace the existing two-blade system is the third and final phase of the Mid-Life Upgrade. The four-blade system will increase aircraft range, speed, payload and reliability, and will reduce maintenance and support requirements. Phase III improvements will produce a viable and effective attack helicopter to support the MV-22 as it is fielded.

<u>UH-1N (HUEY) Mid-Life Upgrade.</u> The UH-1N is a side-by-side, two place combat utility helicopter. Its primary mission is airborne command and control. Additional missions include control of supporting arms, medical evacuation, maritime special operations troop insertion and extraction, and search and rescue. Like the Cobra, the UH-1N is scheduled for a three phase Mid-Life Upgrade. Phase I incorporates new communications and navigation equipment to include GPS/INS, lightweight TACAN, a digital moving map display, satellite radios and a navigational forward looking infrared (FLIR) system. Phase I upgrades will conclude with installation of an integrated glass cockpit. Phase II of the upgrade corrects safety and performance deficiencies by installing a four-blade rotor system. Current funding supports off-the-shelf procurement of commercial components to accomplish phase II upgrades, and an ongoing cost and operational effectiveness analysis verifies and validates the savings and performance that can be achieved by installing the same dynamic components, powertrain, and rotors that will be used to achieve Cobra upgrades. If savings and performance are validated by the completed COEA, these modifications may be

introduced into PR97. Phase III, as yet unfunded, increases weapons capability and sensor fusion to accommodate battlefield digitization.

CH-46 Upgrade. The CH-46 upgrade consists of two programs. The first is the Dynamic Component Upgrade (DCU), the second is the Service Life Assessment Program (SLAP). The DCU is a four year funded safety of flight program that replaces the dynamic components in the Flight Control System, Drive Train and Rotor System. This upgrade does not enhance the performance of the aircraft but returns the performance of the CH-46 to its original characteristics. The upgrade replaces aging components that do not have the service life or performance characteristics to allow the aircraft to complete the assault support mission. The SLAP is an assessment of the airframe and aircraft components and will define the necessary maintenance required in order for the CH-46 to meet mission requirements until it is replaced by the V-22.

ADVANCED TACTICAL AIR RECONNAISSANCE SYSTEM (ATARS). The Advanced Tactical Air Reconnaissance System (ATARS) provides a capability for transitioning to digital, real/near-real-time tactical reconnaissance, and is presently the only funded tactical system under development. It will provide a near term, responsive, manned penetrating tactical reconnaissance capability in Marine Corps F/A-18Ds for sea or expeditionary land-based operations. The reconnaissance-capable F/A-18D(RC) will be equipped with ATARS and the APG-73 upgraded radar. The F/A-18D Night Strike Fighter is a two-seat, supersonic, multi-mission aircraft in service with the Marine Corps, which replaced both the RF-4B and A-6E. ATARS is a self-contained, palletized reconnaissance sensor suite containing three electro-optical/infrared sensors and associated electronics and recorders. Low and medium altitude electro-optical sensors provide dawn-to-dusk high-resolution, vertical or oblique imagery. An infrared line scanner provides day or night high-speed, low altitude, high-resolution infrared imagery. The Phase II upgrade to the APG-73 radar will provide high-resolution ground maps. The upgraded APG-73 is capable

of gathering both wide-area coverage (10nm wide strip) and point-target (small area spot) reconnaissance imagery during all-weather conditions. A data link, now under development, will allow aircrew to transmit imagery to a ground-based image processing station while returning to its home base. The Marine Corps' acquisition objective is to field 31 ATARS suites which will be distributed among its 6 F/A-18D squadrons. The Initial Operational Capability (IOC) will be achieved during FY-98, with a Full Operational Capability (FOC) slated for all 6 squadrons by FY-01.

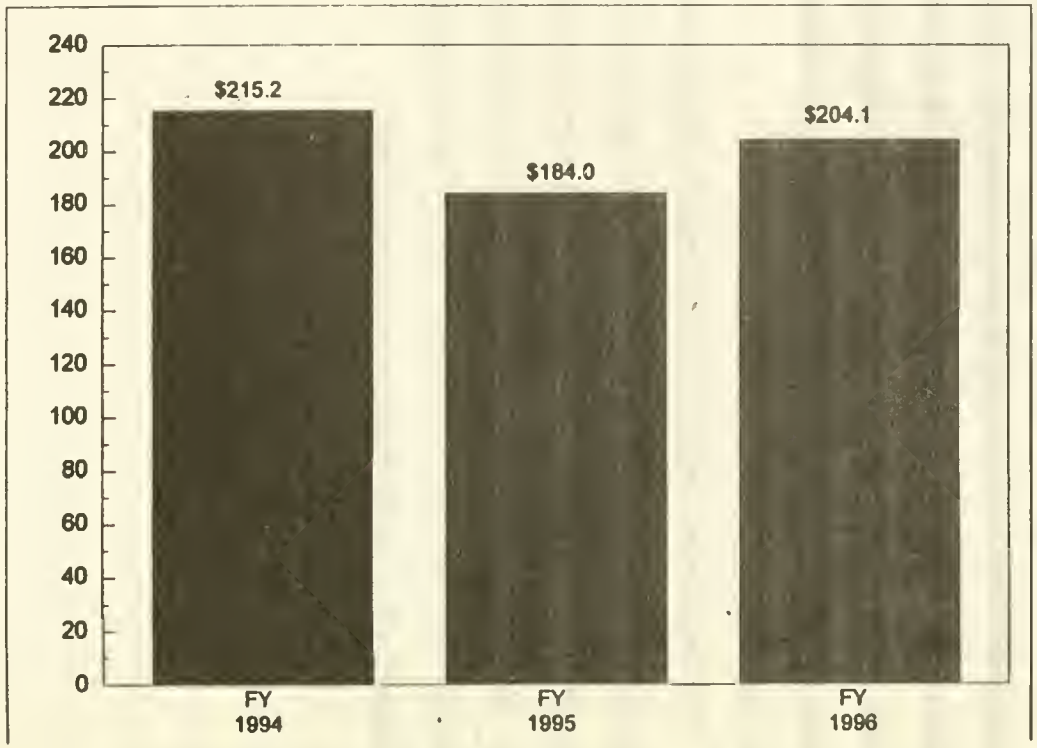
CONCLUSION

Our FY 1996 budget requests for RDT&E,N and PMC represent a long range investment strategy designed to provide highest possible combat readiness within resource constraints. The plan focuses on the most urgent equipment modernization and sustainability requirements. As the Nation's premier expeditionary force in readiness, the Marine Corps stands ready to protect American interests, influence, and ideals. As we have always done, we will accord first priority to our operating forces with the objective of assuring their success on the modern battlefield while conserving our most treasured resource . . . our Marines and Sailors

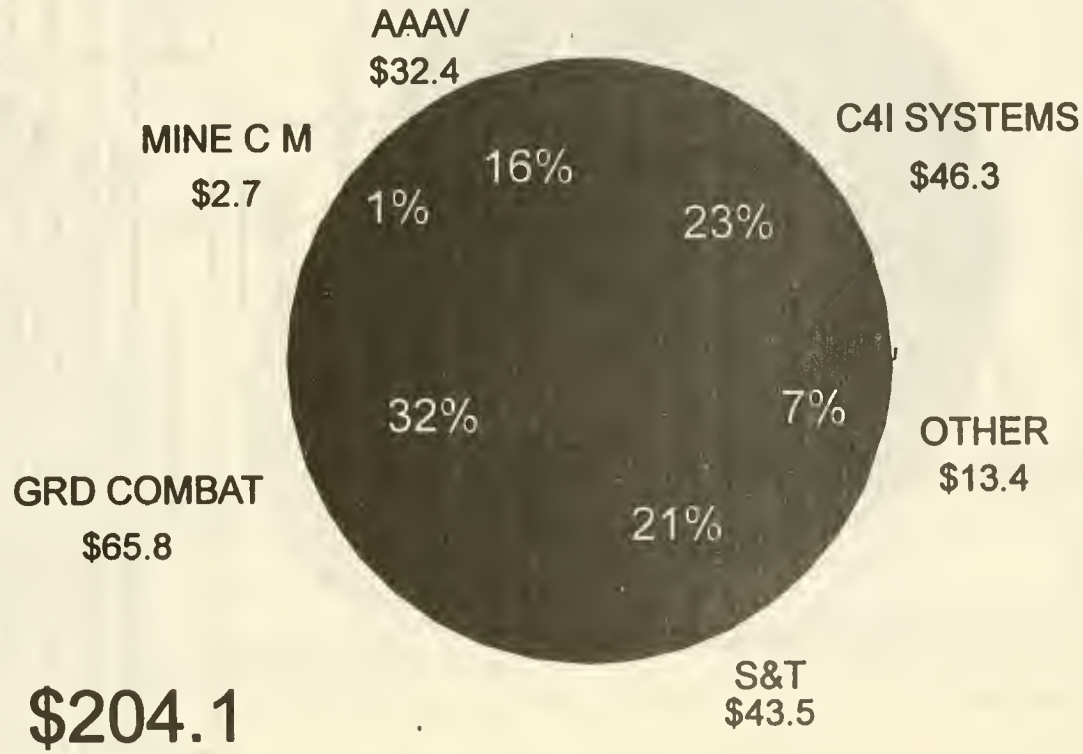
With your assistance, the Marine Corps will remain the ready, relevant, adaptable force needed to meet the many and diverse threats to the security and interests of this Nation. We are ever mindful that our success in meeting these challenges will hinge on the courage, honor, and commitment of the individual Marine. We will be diligent and steadfast, but at the same time frugal, in our efforts to provide them the best equipment and support possible. On behalf of these many thousand young Marines and our Commandant, I offer our sincere thanks for your continuing support.

FY 96 USMC GROUND RDT&E,N

(TOTAL OBLIGATION AUTHORITY)



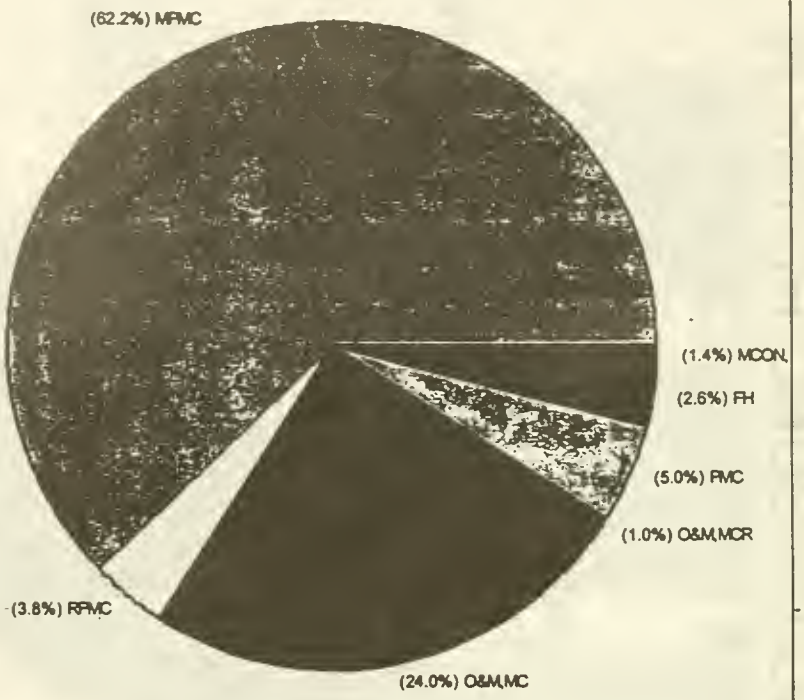
FY 96 USMC GROUND RDT&E,N
(FYDP $ IN MILLIONS)



$204.1

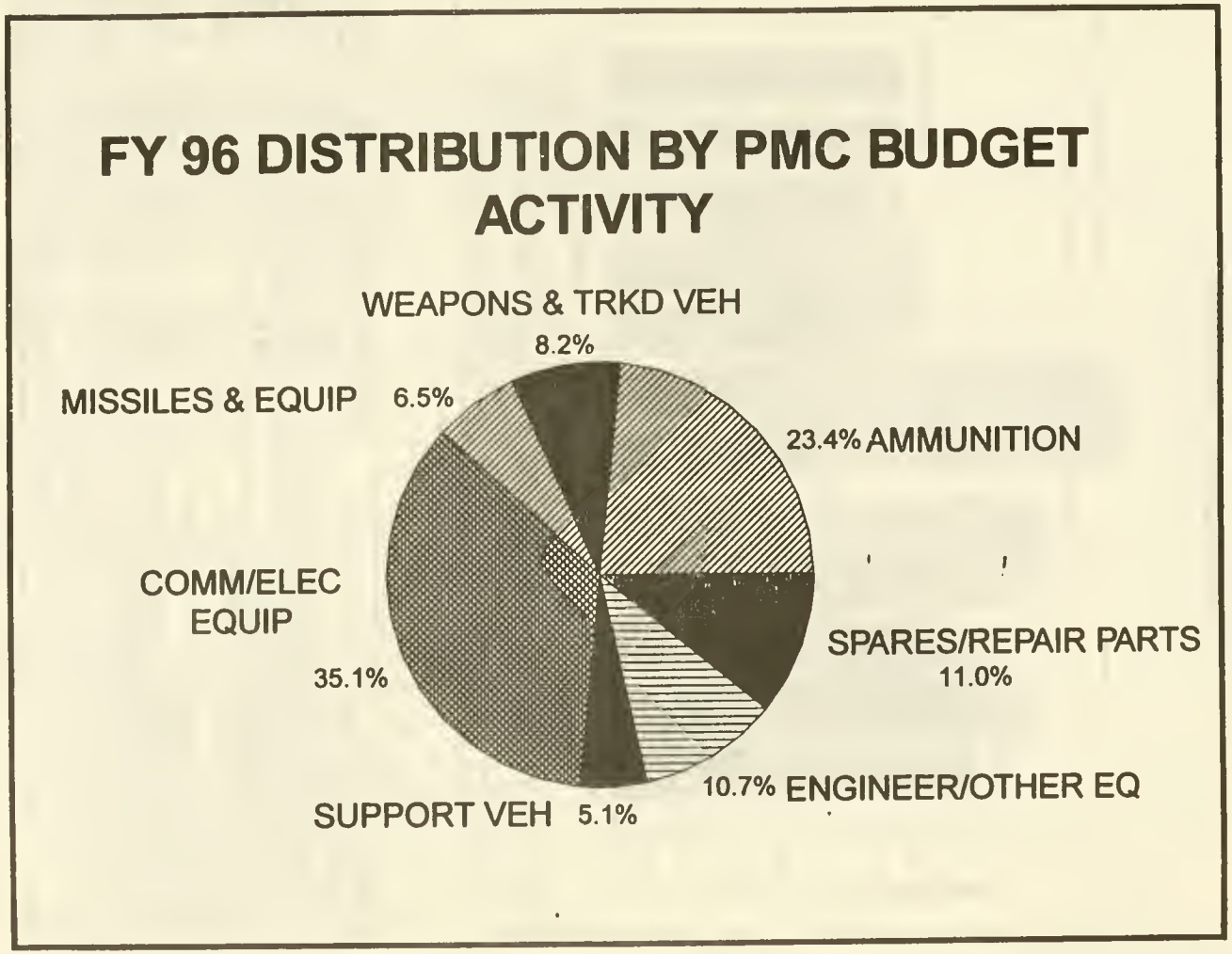
USMC TOTAL OBLIGATION AUTHORITY

(FYDP$ IN MILLIONS)



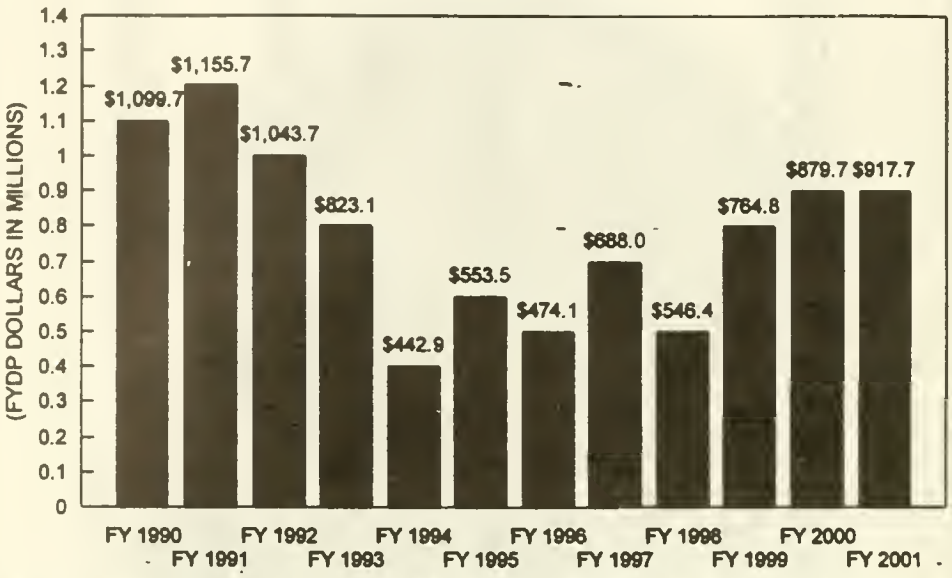
FY 1996

APPROPRIATION TITLE		FY 96	
		AMOUNT	PERCENT
MILITARY PERSONNEL, MARINE CORPS	MPMC	5,877.7	62.2%
MILITARY PERSONNEL, MARINE CORPS RESERVE	RPMC	361.8	3.8%
OPERATION & MAINTENANCE, MARINE CORPS	O&M,MC	2,269.7	24.0%
OPERATION & MAINTENANCE, MARINE CORPS	O&M,MCR	90.3	1.0%
PROCUREMENT, MARINE CORPS	PMC	474.1	5.0%
FAMILY HOUSING	FH	244.9	2.8%
MILITARY CONSTRUCTION (ACTIVE AND	MCON,A&R	130.4	1.4%
	TOTAL	9,448.9	100.0%


FY 96 DISTRIBUTION BY PMC BUDGET ACTIVITY
WEAPONS & TRKD VEH
8.2%
MISSILES & EQUIP
6.5%
23.4% AMMUNITION
COMM/ELEC EQUIP
35.1%
SPARES/REPAIR PARTS
11.0%
10.7% ENGINEER/OTHER EQ
SUPPORT VEH
5.1%

PROCUREMENT, MARINE CORPS

TOTAL OBLIGATION AUTHORITY

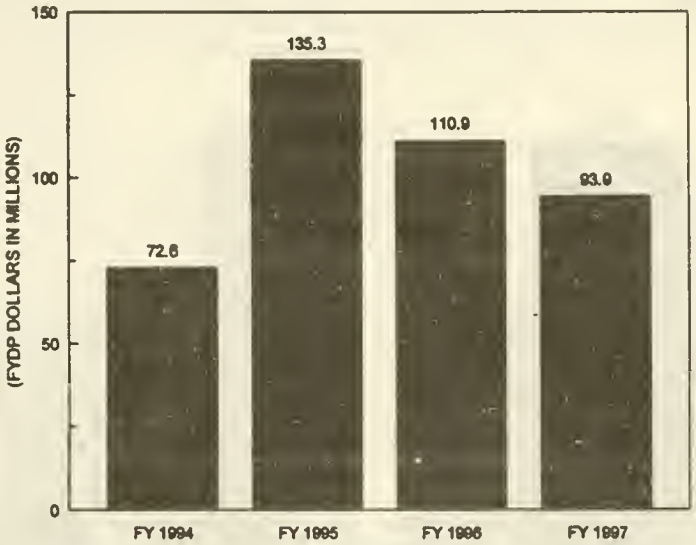


NOTE: FY 1995 PROCUREMENT OF AMMUNITION, NAVY/MARINE CORPS APPROPRIATION IS INCLUDED IN THE FY 1995 TOTAL.

BUDGET ACTIVITY	FY 1994	FY 1995	FY 1996	FY 1997
1 - AMMUNITION	72.6	135.3	110.9	93.9
2 - WEAPONS & TRACKED COMBAT VEHICLES	86.5	30.3	39.1	35
3 - GUIDED MISSILES & EQUIPMENT	29.1	49.9	30.9	41.5
4 - COMMUNICATIONS & ELECTRONICS EQUIPMENT	146.9	196.3	166.5	362.9
5 - SUPPORT VEHICLES	31.8	27.8	24.1	24.9
6 - ENGINEER & OTHER EQUIPMENT	46.9	76.6	50.6	83
7 - SPARES & REPAIR PARTS	29.1	37.3	52	46.8
TOTAL	442.9	553.5	474.1	688

PROCUREMENT, MARINE CORPS

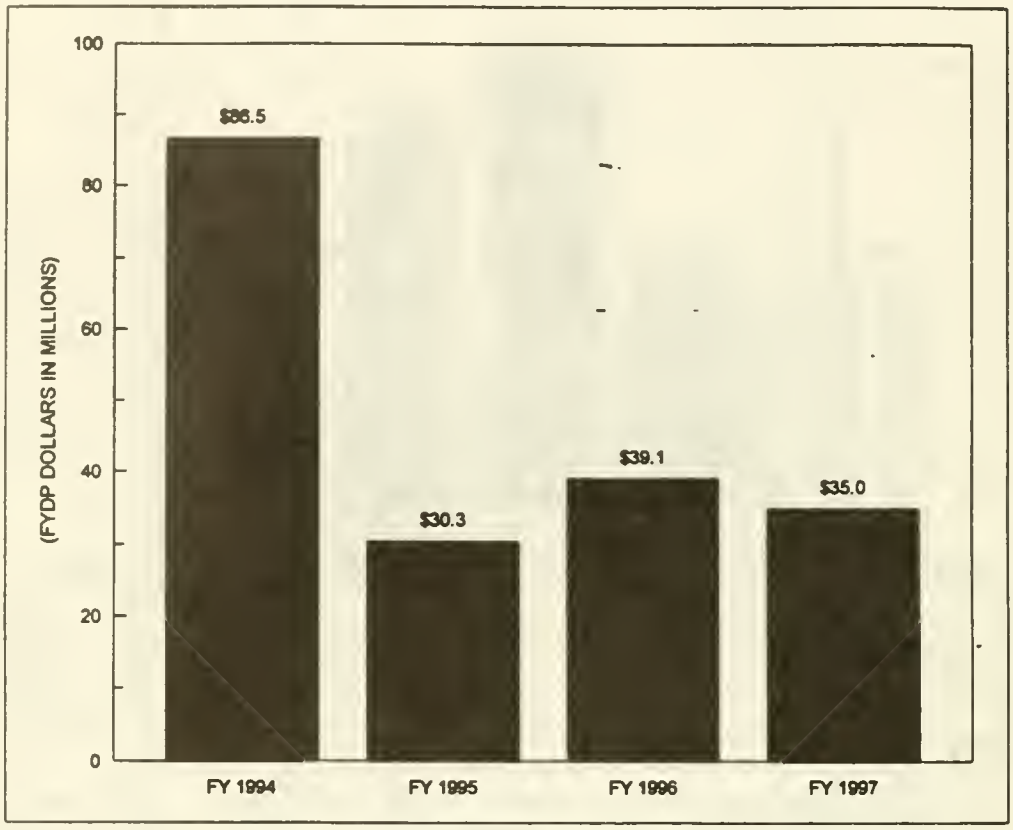
BUDGET ACTIVITY 1 - AMMUNITION



P-1 #	NOMENCLATURE	FY 94	FY 95	FY 96	FY 97
1	5.56 MM, ALL TYPES	1.2	7.1	28.5	22.9
2	7.62 MM, ALL TYPES	0	0	2.1	8.5
3	LINEAR CHARGES, ALL TYPES	0.1	0	0	5.1
4	.50 CALIBER	0.8	6.8	8.6	8.6
5	40 MM, ALL TYPES	5.9	12.3	3.9	3
6	60MM HE M888	0	15.9	9.9	8
7	81 MM HE	17.4	15.6	4.7	2
8	81 MM SMOKE SCREEN	0	4.3	5.5	3
9	81 MM, ILLUMINATION, M853	0	13.9	0	0
10	120 MM TPCSDS-T M865	2.8	10.2	8.9	8.5
11	120 MM TP-T M831	4.4	4.9	3.3	4.4
12	155MM CHG PROP RED BAG	0	0	0	0
13	FUZE, ET, M762	14	17.1	0	0
14	FUZE, ET, M767	4.3	0	0	0
15	25MM, ALL TYPES	2.3	8.8	6.7	4.6
16	9 MM ALL TYPES	1.9	1.9	3	2.4
17	MINES, ALL TYPES	3.2	0	0	1.7
18	GRENADES, ALL TYPES	0	0	0.5	2
19	ROCKETS, ALL TYPES	1.9	2.2	7	0
20	AMMO MODERNIZATION	7.8	8.9	9.6	9.5
21	ITEMS LESS THAN $2 MILLION	4.8	5.4	8.7	1.7
	TOTAL	72.6	135.3	110.9	93.9

PROCUREMENT, MARINE CORPS

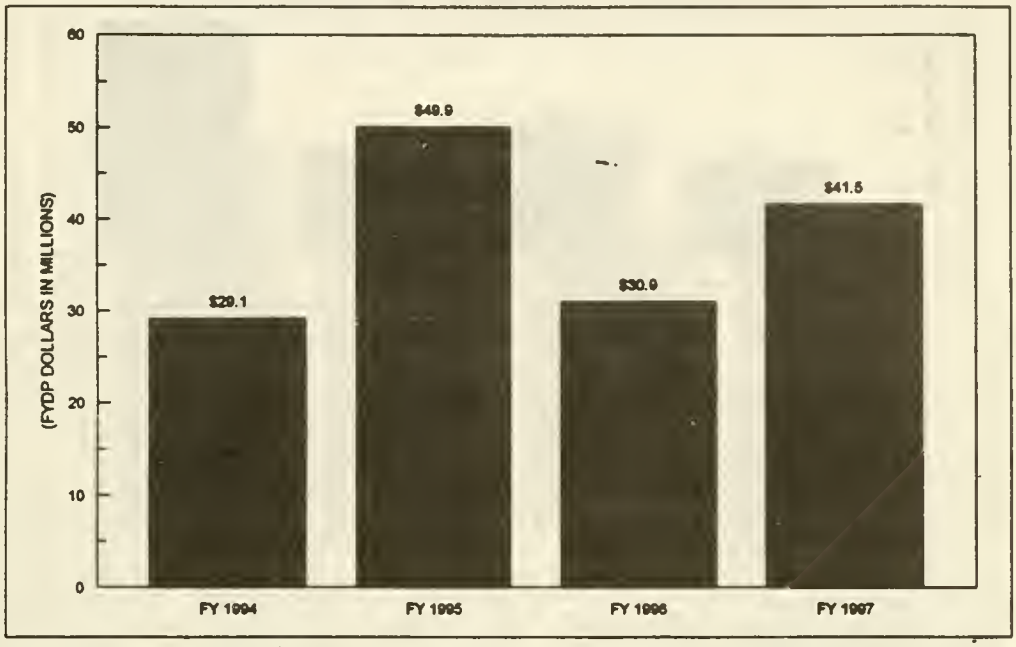
BUDGET ACTIVITY 2- WEAPONS AND TRACKED COMBAT VEHICLES



P-1#	NOMENCLATURE	(DOLLARS IN MILLIONS)							
		FY 1994		FY 1995		FY 1996		FY 1997	
		QTY	$	QTY	$	QTY	$	QTY	$
22	AAV7A1 PIP	-	2.4	-	3	-	11.8	-	14.6
23	LAV PIP	-	6.6	-	23.3	-	23.3	-	15.9
24	LAV	21	72.6	-	0	-	0	-	0
25	MODIFICATION KITS (TRKD VEH)	-	1	-	3.5	-	3.3	-	3.8
26	ITEMS LESS THAN $2 MILLION (TRKD VEH)	-	0	-	0	-	0.1	-	0.1
27	MODIFICATION KITS (ARTY & OTHER)	-	3.9	-	0.5	-	0.5	-	0.5
28	ITEMS LESS THAN $2 MILLION (ALL OTHER)	-	0	-	0	-	0.1	-	0.1
	TOTAL	21	86.5		30.3		39.1		35

PROCUREMENT, MARINE CORPS

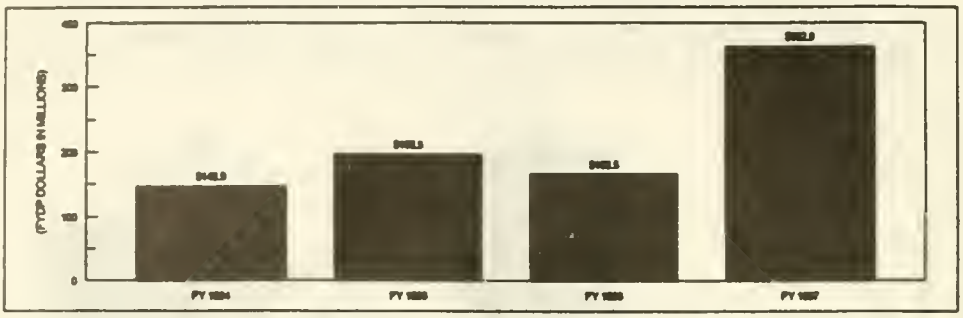
BUDGET ACTIVITY 3 - GUIDED MISSILES AND EQUIPMENT



P-1	NOMENCLATURE	(DOLLARS IN MILLIONS)							
		FY1994		FY 1995		FY 1996		FY 1997	
		QTY	$	QTY	$	QTY	$	QTY	$
29	HAWK MOD	-	2.5	-	0	-	3	-	2.9
30	JAVELIN	-	0	-	0	-	0	-	22.7
31	PEDESTAL MOUNTED STINGER (PMS)	24	19	-	49.8	-	25.8	-	13.9
32	MISSILE MODIFICATIONS	-	7.6	-	0.1	-	2	-	1.9
33	ITEMS LESS THAN $2 MILLION	-	0	-	0	-	0.1	-	0.1
	TOTAL	24	29.1		49.9		30.9		41.5

PROCUREMENT, MARINE CORPS

BUDGET ACTIVITY 4 - COMMUNICATIONS AND ELECTRONICS EQUIPMENT

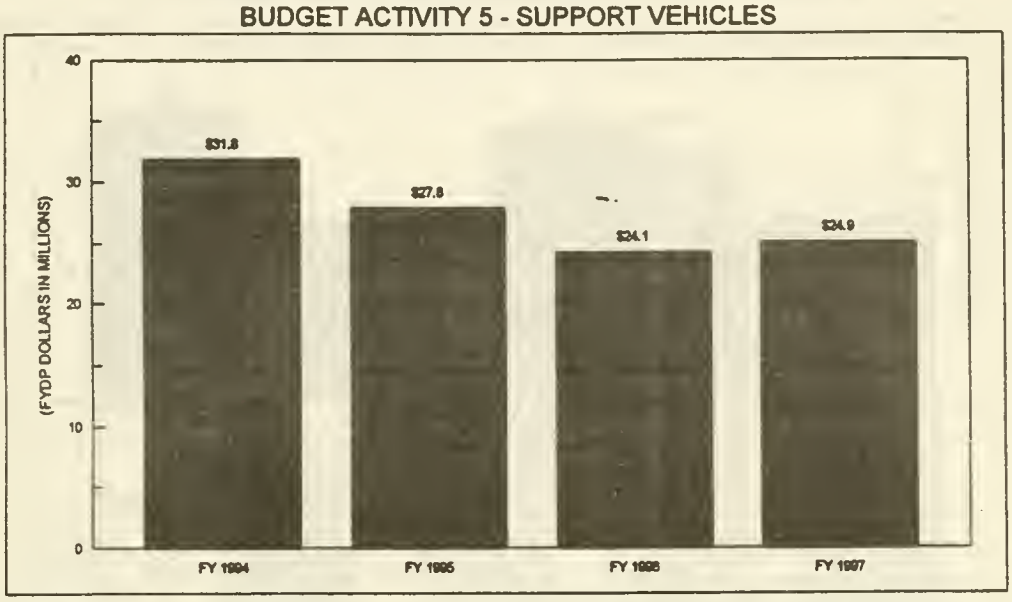


P-1	NOMENCLATURE	(DOLLARS IN MILLIONS)							
		FY 1994		FY 1995		FY 1996		FY 1997	
		QTY	$	QTY	$	QTY	$	QTY	$
34	MANPACK RADIOS & EQUIPMENT	-	0	-	1.6	-	0.7	-	5.5
35	GPS	-	0	-	0	-	0	-	0
36	VEHICLE MOUNTED RADIOS & EQUIPMENT	-	1.1	-	0	-	0	-	0
37	TSC-96 PIP FLEET SATELLITE COMMUNICATION TERMINAL	4	1.7	1	0.5	-	0	-	0
38	UNIT LEVEL CIRCUIT SWITCH (ULCS-USMC)	-	2	-	0	-	0	-	13.1
39	TACTICAL COMMUNICATION CENTER EQUIPMENT	28	2.8	-	0	-	0	-	0
40	TACTICAL DATA NETWORK (TDN)	-	0	-	0	-	0	-	21.3
41	JTIDS INTG	-	1.4	-	6.7	-	6.4	-	5.8
42	AUTO TEST EQUIPMENT	-	0	-	4.7	-	0.7	-	27.7
43	GENERAL PURPOSE ELECTRONIC TEST EQUIPMENT	-	4.4	-	4.4	-	0.2	-	8.0
44	SINCGARS RADIO SYSTEM	-	46.1	-	56.0	-	48	-	53
45	MODIFICATION KITS (TEL)	-	3.6	-	1.1	-	1.1	-	1.1
46	ITEMS LESS THAN $2 MILLION (TEL)	-	1.8	-	1.8	-	1.5	-	1.7
47	POSITION LOCATION REPORTING SYSTEM (PLRS)	-	0	-	3.1	-	0	-	20
48	TACTICAL AIR OPERATIONS MODULE (TAOM)	-	2.2	-	3.7	-	2.4	-	0.2
49	ADVANCED TACTICAL AIR COMMAND CENTRAL	-	8.3	-	0	-	7.2	-	0
50	MARINE TACTICAL COMMAND AND CONTROL SYS	-	2.6	-	6.5	-	0	-	0
51	ADVANCE FIELD ARTILLERY TACTICAL DATA SYS	271	9.6	137	5.1	186	12.1	186	11.0
52	METEOROLOGICAL SYSTEMS	-	0	14	6.5	7	3.4	-	0
53	INTELLIGENCE SUPPORT EQUIPMENT	-	25.3	-	33.3	-	6.3	-	17.2
54	MODIFICATION KITS (INTEL)	-	4.7	-	0.1	-	0.0	-	0.8
55	ITEMS LESS THAN $2 MILLION (INTEL)	-	2.7	-	0.1	-	1.6	-	0
56	ELECTRONIC TMDE REPAIR FACILITY	4	0.4	4	0.7	-	0	-	0
57	GENERAL PURPOSE MECHANICAL TMDE	-	0.9	-	0.9	-	3.1	-	3.2
58	NIGHT VISION EQUIPMENT	-	12.4	-	38.4	-	2.3	-	11.5
59	MARINE ENCHANCEMENT PROGRAM	-	0	-	0	-	3.4	-	3.3
60	ADP EQUIPMENT	-	10.1	-	12.9	-	22.8	-	28.9
61	TEST, CALIBRATION & MAINTENANCE SUPPORT	-	1.1	-	1.5	-	0	-	0
62	MODIFICATION KITS (NONTEL)	-	1.3	-	1.1	-	6.7	-	40
63	ITEMS LESS THAN $2 MILLION (NONTEL)	-	0	-	0	-	1.5	-	1.8
64	GROUND MOBILE FORCES (GMF)	-	0	-	0	-	0	-	7.7
65	DIGITAL TECHNICAL CONTROL FACILITY	-	0	-	0	-	0	-	10.1
66	AN/TPQ-36 FIREFINDER RADAR UPGRADES	-	0	-	0	-	0	-	31.7
67	TACTICAL COMBAT OPERATIONS	-	0	-	0	-	11	-	21.4

TOTAL	305	146.9	156	198.3	195	166.5	166	362.9

PROCUREMENT, MARINE CORPS

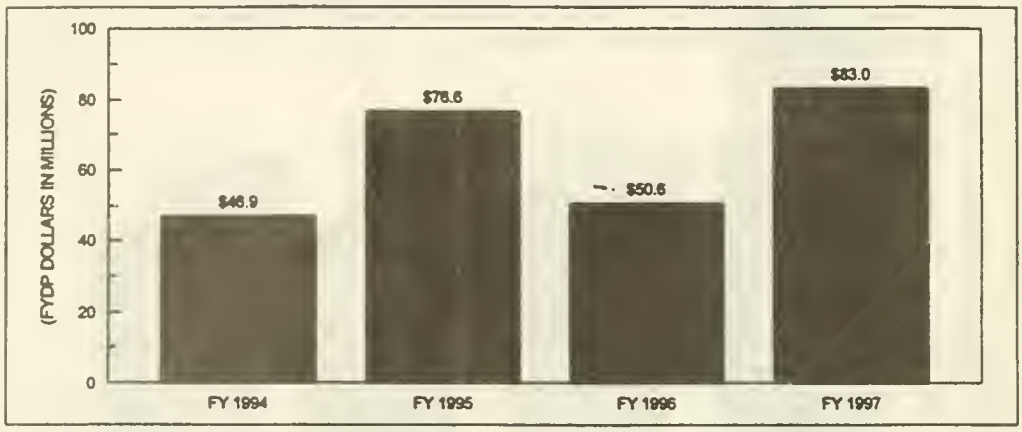
BUDGET ACTIVITY 5 - SUPPORT VEHICLES



P-1	NOMENCLATURE	(DOLLARS IN MILLIONS)							
		FY 1994		FY 1995		FY 1996		FY 1997	
		QTY	$	QTY	$	QTY	$	QTY	$
68	COMMERCIAL PASSENGER VEHICLES	96	1.7	103	1.8	194	2.8	184	2.9
69	COMMERCIAL CARGO VEHICLES	-	12.6	-	7.6	-	9.8	-	10.1
70	HIGH MOBILITY MULTIPURPOSE WHEELED VEHICLE	-	0	-	0	-	0	-	5.1
71	LOGISTICS VEHICLE SYSTEM	81	12	68	11.1	-	0	-	0
72	TRAILER, ALL TYPES	-	1.3	-	2.8	-	4.9	-	5.1
73	MODIFICATION KITS	-	4.2	-	4.5	-	6.5	-	1.6
74	ITEMS LESS THAN $2 MILLION	-	0	-	0	-	0.1	-	0.1
	TOTAL	177	31.8	171	27.8	194	24.1	184	24.9

PROCUREMENT, MARINE CORPS

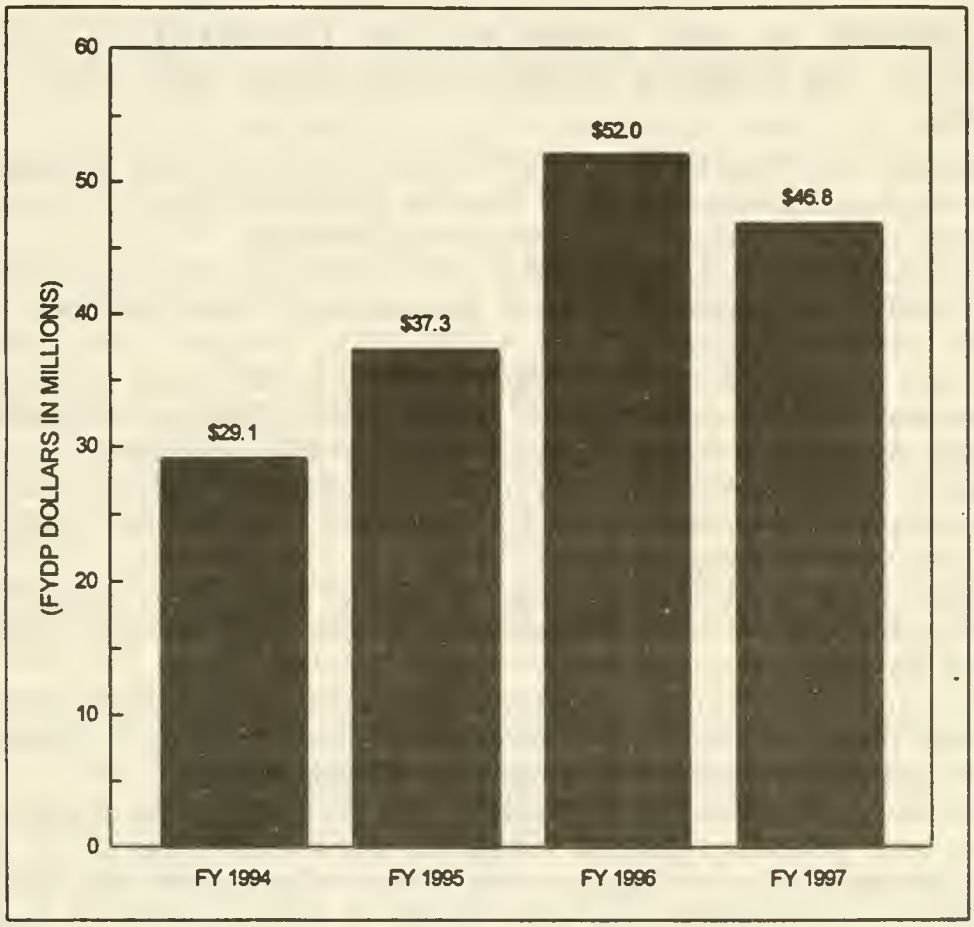
BUDGET ACTIVITY 6 - ENGINEER AND OTHER EQUIPMENT



P-1	NOMENCLATURE	(DOLLARS IN MILLIONS)							
		FY 1994		FY 1995		FY 1996		FY 1997	
		QTY	$	QTY	$	QTY	$	QTY	$
75	ENVIRONMENTAL CONTROL EQUIP, ASSORTED	-	2	-	2.2	-	2.3	-	2.5
76	TACTICAL FUEL/WATER SYSTEMS (TFS) EQUIP	-	1.1	-	0	-	0	-	0
77	POWER EQUIPMENT, ASSORTED	-	2.4	-	2.6	-	2.4	-	3.8
78	MINE/COUNTER-MINE SYS	-	0	-	0	-	0	811	19.9
79	AUTOMATIC BUILDING MACHINE	9	1.8	-	0	-	0	-	0
80	COMMAND SUPPORT EQUIPMENT	-	3	-	0.3	-	0	-	0
81	AMPHIBIOUS RAID EQUIPMENT	-	1.8	-	0.2	-	0.3	-	0.3
82	PHYSICAL SECURITY	-	0.7	-	0.8	-	1.8	-	1.4
83	GARRISON MOBILE ENGINEER EQUIPMENT	-	2.1	-	3.8	-	5.2	-	5.4
84	TELEPHONE SYSTEM	-	0.4	-	13.3	-	8.3	-	5.3
85	WAREHOUSE MODERNIZATION	-	2.2	-	3.7	-	2.9	-	4
86	MATERIEL HANDLING EQUIPMENT	-	3.2	-	3	-	3.1	-	3.2
87	FIRST DESTINATION TRANSPORTATION	-	1.9	-	2.5	-	1.7	-	1.4
88	FIELD MEDICAL EQUIPMENT	-	3.5	-	3.5	-	3.2	-	0
89	TRAINING DEVICES	-	13.8	-	33.3	-	17.8	-	30.8
90	CONTAINER FAMILY	-	3	-	5.2	-	0	-	4.1
91	MODIFICATION KITS	-	0.1	-	0.8	-	1.5	-	1.1
92	CHEMICAL AGENT MONITOR (CAM)	222	1.2	-	0	-	0	-	0
93	ITEMS LESS THAN $2 MILLION	-	0	-	1.6	-	0.1	-	0.2
94	DRUG INTERDICTION	-	2.7	-	0	-	0	-	0
	TOTAL	231	46.9	0	76.6	0	50.6	811	83

PROCUREMENT, MARINE CORPS

BUDGET ACTIVITY 7 - SPARES AND REPAIR PARTS



P-1	NOMENCLATURE	(DOLLARS IN MILLIONS)			
		FY 1994	FY 1995	FY 1996	FY 1997
–	INITIAL SPARES	20.5	27.9	41.5	36
–	REPLENISHMENT SPARES	8.6	9.4	10.5	10.8
95	TOTAL	29.1	37.3	52	46.8

Mr. HUNTER. Thank you, General Wilhelm.

General Loh still has a problem this morning in terms of getting here. Brig. Gen. Ted Campbell is sitting in for him. General Campbell, thank you for being with us and please proceed.

STATEMENT OF GEN. JOHN M. LOH, COMMANDER, U.S. AIR FORCE, AIR COMBAT COMMAND, BY BRIG. GEN. TED CAMPBELL

General CAMPBELL. Thank you, Mr. Chairman and members of both subcommittees. I would like to read, with your permission, General Loh's opening statement for the record.

Mr. Chairman and members of the committees, thank you for the opportunity to discuss this vital component of our Nation's Armed Forces with you today.

As the commander of Air Combat Command, I am the provider of combat air power to our unified war-fighting commanders around the world. Should we face a regional aggressor, our commanders will call immediately on our land-based fighter squadrons for a responsive deterrent and as a lethal and flexible linchpin of our joint war-fighting team.

I expect our first active wings to deploy their first squadrons to any trouble spot within 24 hours and their remaining squadrons within 72 hours.

Our squadron's rapid redeployment to the Middle East last October and Iraq's subsequent retreat from the border is a graphic example of their responsiveness and deterrent value.

Ten wings of land-based fighters can fly over a thousand sorties a day, and precision guided weapons allow each aircraft to attack multiple targets on a single sortie. Given our fighters' unparalleled capability, we must ensure that we have enough of them and that we have them in the right mix.

My analysis of our ability to fight two back-to-back major regional contingencies showed that, with 20 wings, we will have to swing many of our high-value assets, our Stealth and electronic combat aircraft, as well as our precision capable bombers and fighters from one major regional contingency to the next. I cannot emphasize enough that this is an untested strategy that involves additional risk.

We perform three broad classes of fighter missions: air superiority, ground attack, and force support. To perform our missions in the future with a smaller, home-based force we will have to invest wisely in a combination of upgrades, new weapons, and new aircraft.

Whenever we commit our forces, the commander's first task must be to seize air superiority. Our joint force can then deploy unimpeded to prosecute the joint campaign. We must understand the ramifications of our new defense environment. It poses unprecedented challenges in the fight for air superiority.

We must deploy halfway around the world with little or no infrastructure and sustain around-the-clock operations at the end of a 6,000-mile logistical train. We must win the air battle quickly with overwhelming advantage and no losses over deadly air defenses against sophisticated enemy aircraft.

It is not enough to be marginally better, and even modified F–15's are not enough. That is why we need the F–22. Today, we perform three important ground attack missions with our bombers and fighters: strategic attack, interdiction, and close air support. Our ground attack fighters include the F–117, the F–111, the A–10 and our multirole fighters, the F–15E, and F–16.

We are upgrading their capability when it makes sense. We are arming them with more effective and efficient weapons.

Our F–111's give us valuable precision attack capability, but they are old and expensive to maintain, so we will retire them soon. That is why we are working so hard to get precision weapons capability on our B–1's and B–2's.

Beyond the turn of the century nearly 2,000 F–16's will reach the end of their service life and need to be replaced. The aircraft that emerges from the joint advanced strike technology, or JAST, program will be the affordable replacement we need.

Another one of our core missions is close air support for our partners on the ground. Today, we are providing close air support better than ever with our A–10's, OA–10's, and specialized F–16's. We are committed to the close air support mission, and are investing in new systems to deliver it more effectively around-the-clock.

Suppressing enemy air defenses is a vital force support mission. For electronic suppression we rely on the EF–111 radar jammer. It is in constant demand and its jamming systems are unmatched by any other aircraft.

The plan to retire the EF–111 concerns me greatly because I do not see a suitable alternative. A lesser replacement will harm the effectiveness of the aircraft that rely on their support. In my opinion, it would be a mistake to retire the EF–111.

Finally, battlefield reconnaissance is critical in any theater campaign. It gives our pilots valuable target imagery and our planners timely battle damage assessment. As we retire our lone squadron of RF–4's we know that satellites cannot fill the void. An affordable reconnaissance POD that we can carry on our F–16's or F–15's is the best near-term solution.

I will conclude today with my thoughts on the importance of the F–22 and JAST because these major fighter programs may be the only ones we have for the next 50 years.

Today, we have $18 billion invested in F–22 research and development. We need to leverage this investment by developing a family of F–22 derivatives that can meet some of our other mission needs in the years ahead.

A multirole derivative along the lines of the F–15E could have a more robust air-to-ground capability. We could also tailor other derivatives to perform electronic combat and battlefield reconnaissance. We could also field a Navy variant if the Navy needs a high-end, long-range replacement for its attack fighters.

With nearly 2,000 F–16's that will need an affordable replacement, we have the dominant requirement for the aircraft that will come out of Joint Advanced Strike Technology [JAST]. JAST should also produce a family of derivatives that build on the baseline Air Force fighter.

With new propulsion technology, JAST can meet the Marines' need for a short takeoff and landing fighter and should the Navy

need an affordable replacement for its F–18's, JAST can meet that need as well.

Finally, JAST can produce an affordable export fighter, minus the sensitive technologies, that can compete in the global market to replace our allies' aging fighters and ensure the long-term vitality of our fighter industrial base.

Today, we have the world's finest air force; the F–22 and JAST are the vital modernization programs that will keep it that way.

I would like to thank the members of the committees for your longstanding support of our Nation's defense and request your continued support for air power that meets our defense needs in a turbulent world. Thank you. Sir, we would like to submit our statement for the record also.

DEPARTMENT OF THE AIR FORCE

Presentation to the Subcommittees on Procurement and Research and Development

House National Security Committee

on

7 March 1995

SUBJECT: USAF Fighter Requirements

STATEMENT OF: Gen John M. Loh
Commander, Air Combat Command

NOT FOR PUBLICATION UNTIL
RELEASED BY THE HOUSE
NATIONAL SECURITY COMMITTEE

Mr. Chairman and members of the Committee, thank you for the opportunity to discuss our fighter force, a vital component of our nation's armed forces.

As the commander of Air Combat Command, it is my responsibility to organize, train and equip our U.S.-based combat air forces; when necessary, these forces are provided to our unified and joint commanders for worldwide deployment.

Air Combat Command is the Air Force's largest operational command. I have more than 135,000 active duty military members and civilians under my command; I am also responsible for more than 107,000 Air National Guard and Air Force Reserve members under mobilization conditions.

Air Combat Command possesses 24 bases, but we also have major tenant units at 8 non-Air Combat Command installations. Our people live and work in 21 countries worldwide, and we have about 8,000 people deployed around the globe on any given day supporting operations in Southwest Asia, Bosnia, Haiti, and Central and South America. They perform a variety of peacetime missions ranging from no-fly zone enforcement to humanitarian relief and counter-narcotics operations.

Today, Air Combat Command owns ninety percent of the Air Force's conventional warfighting assets. We comprise the largest share of the Air Force's total fighter assets, and our forces also include bombers, command, control, and communications assets, intra-theater airlift aircraft, as well as reconnaissance and rescue forces.

Our fighters have always been key to our operations, and we will continue to rely heavily on them. Their capabilities are even more critical to us now that the bulk of our combat air forces reside within the Continental United States. My discussion will center on the importance of our fighter force, the missions they perform, and how we plan to perform these missions in the future.

THE FIGHTER CONTRIBUTION

Today, we are a smaller, home-based expeditionary force; yet we are still charged with protecting our nation's interests around the world. When necessary, we must rapidly project our military power -- with limited support structure -- to regions that may have little or no support infrastructure. This requirement places a new premium on responsive and sustainable combat airpower -- and our land-based fighter force delivers it. We have aggressively drawn down to 20 fighter wing equivalents as specified in the Bottom-Up Review; however, we are ensuring that our land-based fighter force remains a responsive, lethal, sustainable, and versatile element of our nation's joint military team.

Our land-based fighters are always ready. With the global range provided by air refueling they can project military power quickly to any combat theater, and initiate around-the-clock combat operations within a matter of days. Today our wings have readiness requirements unmatched by other joint forces. I expect my active duty operational fighter wings to deploy their first squadron to any trouble spot within 24 hours of notification; they must deploy all of their remaining squadrons within 72 hours. Under mobilization conditions, our reserve squadrons have 24 hours to recall their personnel, and they must deploy within another 48 hours. With such responsiveness, we can deploy several squadrons into any theater within days. We can deploy -- in less than 30 days -- all ten fighter wings required to fight a major regional conflict (MRC).

Last October we rapidly redeployed several squadrons of deterrent airpower to Southwest Asia when Iraq again threatened Kuwait -- a graphic example of our responsiveness. Our land-based fighter squadrons were launching within hours of receiving their deployment orders, and most were capable of around-the-clock theater operations within 72 hours.

Lethality is another key attribute of our fighter force. Ten wings of land-based fighters can generate over a thousand sorties a day, and arming them with precision-guided munitions allows each fighter to attack multiple targets on a single sortie. In World War II, it took hundreds of bombers and the loss of many crews to attack a single pinpoint target deep in enemy territory. Today, however, an F-15E carrying precision-guided weapons takes one sortie and one weapon to hit the same type of target. These weapons are tremendous force multipliers that allow our deployed fighter force to attack thousands of individual targets in a single day.

In addition, our F-117 can attack at night with stealth, requiring fewer support assets such as escort fighters and electronic combat aircraft, and risking far fewer crews.

Sustainability is another valuable dimension of our fighter force. Our land-based force can sustain high-tempo combat operations at two to three times their normal peacetime rate, when infrastructure permits, and can launch sorties at a far greater rate than carrier-based fighters. During the Gulf War, our Air Force fighters flew nearly 60 percent of the overall Coalition combat sorties, providing the bulk of America's joint combat airpower.

Our fighters also embody versatility as they routinely execute a myriad of combat and combat support missions with an array of weapons suited for almost any target. With an "operator in the loop," our air and ground commanders can easily divert our fighters to perform higher priority missions or hit time-critical targets revealed as the battle unfolds.

This combination of responsive, lethal, sustainable, and versatile combat power gives our theater commanders unmatched operational flexibility.

HOW MANY DO WE NEED?

Given our fighter's tremendous combat capability, we must ensure that we have enough of them and in the right mix. Since the Bottom-Up Review, we carefully analyzed our ability to win -- decisively -- two nearly simultaneous MRCs. The results of our analysis underscored the vital contribution of our land-based fighter force, and quantified our need to maintain at least 20 wings. Even with 20 wings, our analysis showed that we will have to "swing" many of our high-value assets -- including stealth and precision-capable fighters, and bombers -- from one MRC to the next to win overwhelmingly and minimize American casualties. I cannot emphasize enough that this is an untested strategy that involves additional risk.

The bottom line is that we cannot afford to let our fighter force structure slip below 20 wings. Due to the attrition of our F-15s and F-16s, and the programmed retirement of our F-111s, we will fall below this essential 20-wing level before we start fielding our next generation fighters. To remedy this shortfall we will have to establish the requirement and program for new Fighters to maintain a robust 20-wing force until we begin fielding the F-22 and the next generation affordable fighter.

We must also remember that this 20-wing force consists of 13 active and seven Air National Guard and Air Force Reserve wings with an effective mix of special purpose and multi-role aircraft. It retains most of our high-demand specialized fighters in the active force, and leaves the bulk of our general purpose fighters, such as the F-16, in the Guard and Reserve. We think this active-reserve mix is about right given our current operational tempo.

In conclusion, our land-based fighter force is a potent and flexible member of our joint airpower team, and it is absolutely essential in dealing with any major regional conflict.

PERFORMING OUR FIGHTER MISSIONS -- TODAY AND TOMORROW

Now I'd like to briefly discuss the specific missions that our fighters perform within three broad mission areas: air superiority, ground attack, and force support. I will touch on the objectives of each of our missions, how we perform them today, and how we plan to perform them in the years to come.

Air Superiority

In any major regional contingency, the Joint Force Commander's first priority must be the fight for air superiority -- the control of the air and space over the battlefield that ensures freedom of action for the entire joint force. This is the price of admission to any conflict; air superiority enables the unimpeded deployment of our follow-on forces by protecting them from air attack, and allows us to accelerate our offensive tempo by striking the enemy from the air at the time and place of our choosing. Because it is so important to the rest of the joint force, we need to win it quickly and decisively. This is why our air superiority F-15s were the first fighters we sent to Southwest Asia in 1990 when Iraq invaded Kuwait and our major joint deployment got underway. They were also the first fighters we redeployed last October when Iraq again threatened Kuwait. We place such a high priority on air superiority for good reason. As a result, American ground forces have not come under air attack in over 40 years.

However, air superiority involves far more than air-to-air combat against the enemy's aircraft. We win air superiority by attacking the enemy's entire air defense system.

Our air superiority fighters -- F-15s and F-16s armed with the Advanced Medium Range Air-to-Air Missile (AMRAAM) -- sweep the skies of enemy aircraft like we did over Iraq. At the same time, we attack the enemy's air surveillance and surface-to-air missile radars with our F-4G "Wild Weasel" fighters and specially-modified F-16s employing High Speed Anti-Radiation Missiles. Finally, we attack the enemy's air force on the ground with precision weapons delivered by a variety of ground attack aircraft such as the B-1, B-2, F-117, F-111, and F-15E.

To preserve our air superiority advantage, we have invested a great deal in the F-15 Multi-Stage Improvement Program, and we are buying the AMRAAM for our F-15E and F-16 multi-role fighters as well. But many of our F-15s will be 30 years old beyond the turn of the century, and there are new aircraft and air-to-air weapons being developed around the world that will erode the F-15's overwhelming superiority in air combat.

Even if we try to breath new life into the F-15, it won't meet our operational needs because it will never have stealth. Therefore, by 2004, we will start to field the F-22 to replace our aging F-15s.

The F-22 is our main priority for the near term; not only because of what it means for air superiority, but because its stealth gives it unprecedented versatility that will allow us to pursue new operational strategies in the future.

The F-22 will be far more lethal and efficient than our current air superiority fighters, allowing us to dominate the skies over any distant battlefield -- faster and with less support -- than we've ever done it before. Our F-22 squadrons will be able to deploy from home quickly -- with half the airlift support needed for the F-15 -- to establish air superiority quickly, and they will have the reliability to sustain high-tempo operations while our logistics forces are still enroute.

In air combat, the F-22 will be unrivaled. Its next generation stealth, advanced avionics, and the AMRAAM will guarantee the F-22 a first look, first shot, and first kill advantage against any existing or projected fighter, and its unprecedented stealth will also negate most of an enemy's lethal air defenses. This will allow our F-22s to operate effectively over the enemy's most heavily defended territory.

The F-22 will also be much more versatile than the F-15. Its stealth, unprecedented range, and ability to deliver accurate air-to-ground weapons will allow it to hit time-critical targets deep in enemy territory, such as weapons of mass destruction, long before they can threaten the deployment of our follow-on forces. And stealth allows them to operate without the large support packages that our other fighters need – 24 hours a day.

To fully appreciate the challenge of gaining and maintaining air superiority with our smaller, home-based force, we must remember that we have to deploy half-way around the world -- with little theater infrastructure – and win it quickly over enemy territory, with overwhelming advantage and little or no attrition. It is not enough to be just marginally better than the F-15, or comparable threat fighters like the Mig-29, Su-27, and the Su-35. The success of our entire joint force hinges on it.

Ground Attack

In the ground attack role, our fighters perform three important missions: strategic attack, interdiction, and close air support. We can perform these missions with a variety of versatile fighter aircraft.

Strategic Attack / Interdiction

Strategic attack helps to cripple an enemy's war making strategy by neutralizing his weapons of mass destruction, air defense networks, transportation networks, command and control systems, leadership targets, and key industries. By doing so, we give all of our joint forces greater freedom of action to perform their missions including attack of the enemy's fielded forces.

The objective of interdiction is to delay, disrupt, or destroy the enemy's military potential before it can be brought to bear against our own forces. Our interdiction effort may have strategic, operational, or tactical effect depending on the type of target and how quickly the effects are felt. Typical interdiction targets for our fighters include advancing ground forces, rail lines, shipping, and logistical chokepoints such as ports and bridges.

We perform these missions with a wide variety of bombers and fighters. In the fighter case, these include the F-117, the F-111, and our multi-role F-15E and F-16. Our F-117s are particularly suited to these missions because they can attack the most heavily-defended targets with great precision, fewer support assets, and less risk to our aircrews. For example, during Desert Storm, our F-117s comprised only 2.5% of our combat "shooters" on the first day of the war, yet they hit 31% of the strategic targets.

In the future, we are improving the stealth of our F-117s, giving them better targeting capability using links to off-board intelligence platforms, and modifying them to deliver the GPS-guided Joint Direct Attack Munition that can hit targets accurately in all weather.

Since our other fighters will deliver the preponderance of ground attack firepower, we are upgrading them as well. For example, we plan to upgrade the F-15E with a

better night targeting system, links to off-board targeting cues, and the capability to deliver advanced munitions such as JDAM and the new Joint Standoff Weapon (JSOW).

We are upgrading the F-16 by giving it better night and all-weather precision attack capability, including JDAM and JSOW, as well as better threat warning, and electronic identification "friend or foe" capability to minimize the risk of fratricide in air combat.

Our F-111s are invaluable because they comprise a great deal of our precision weapons capability. But they are old and very expensive to maintain; we will retire them soon. However, we can't afford to go without their precision weapons capability, and that is why we are working so hard to upgrade our B-1 and B-2 bombers to deliver precision weapons.

The F-22 and its follow-on derivatives will make a significant contribution in the strategic attack and interdiction missions as well. The first production F-22s can carry two JDAMs, giving the aircraft an effective, precision air-to-ground capability. With its great range, the F-22 can operate deep over enemy territory, striking high-value targets – even in daylight.

Beyond the turn of the century nearly 2,000 F-16s will reach the end of their service life, and we will need to replace them with an affordable ground attack fighter. The primary aircraft to emerge from the Joint Advanced Strike Technology, or JAST, program will meet this need. The JAST aircraft will be an affordable ground attack fighter that builds on the family of stealth, avionics, flight control, and engine technologies developed for the B-2 and the F-22, as well as new state-of-the-art technologies and innovation.

Close Air Support

Our remaining ground attack mission is close air support. It is vital for our ground forces engaged in close combat with the enemy. I am fully committed to our CAS mission. We perform CAS better today than we ever have using our OA-10 forward air control aircraft in concert with our A-10 "tank killers" and our Block 40 F-16s that are specialized for CAS.

To deliver more effective night close air support, we are investing in night vision goggles and imaging systems for all of CAS aircraft. We are also modifying the CAS F-16s with a laser spot tracker similar to that already on the A-10, and improving greatly our air-to-ground communications with a low-cost data transmission system -- the Improved Data Modem (IDM). All of these upgrades will allow our CAS aircraft to better find small, mobile targets at night and reduce the ever-present danger of fratricide.

Fighters in a Supporting Role

Electronic Combat

Electronic combat is a vital support mission for our fighters. For our air superiority and ground attack fighters to maximize their effectiveness in the face of deadly air defenses, we rely heavily on the support of our specialized fighters that perform the Suppression of Enemy Air Defenses, or SEAD. We perform two types of SEAD: electronic suppression with our EF-111 radar jammers, and destructive suppression, or DSEAD, with our F-4G "Wild Weasels" and our latest Block 50 F-16s upgraded with the HARM Targeting System (HTS).

The EF-111 was a star performer during the Gulf War in the electronic combat role, and its radar jamming system is unmatched by any other aircraft. Our EF-111s

are in constant demand by our warfighting commanders, and the proposal to retire them causes me great concern because I do not see a suitable alternative. If we accept a lesser replacement for the EF-111, we will hurt the effectiveness of all of our aircraft that rely so heavily on its support.

For destructive suppression, F-4Gs have been workhorses since the Vietnam War. Their capability is unmatched, but they are old and expensive to maintain; we will retire them soon. Our newest Block 50 F-16s, upgraded with the HTS, will become our mainstay in the destructive suppression role. With links to our electronic surveillance aircraft, the F-16 with HTS can pinpoint enemy radar sites with great accuracy, and employ the HARM to destroy them. These new systems are already in operation in the skies over Southwest Asia.

In the future, a specialized F-22 derivative could perform the destructive suppression mission.

Battlefield Reconnaissance

Battlefield reconnaissance is another vital element in any theater air campaign, giving our pilots valuable target imagery, and giving our planners timely battle damage assessment. Today we rely heavily on our lone squadron of RF-4s, along with the reconnaissance assets of our sister services, and reconnaissance provided by our national overhead assets. However, the cost to maintain the RF-4 is forcing us to retire the last of our fleet this year. We know that overhead assets cannot fill the void left by the RF-4 -- satellites lack the responsiveness required in high-tempo theater air operations. We must field a suitable replacement for the RF-4.

An affordable reconnaissance pod that we can put on our F-16s or F-15s will be the best near term solution -- retaining our capability to give our Joint Force Commanders the responsive battlefield reconnaissance they need.

OUR TOP MODERNIZATION PRIORITIES -- THE F-22 AND JAST

In my opinion, we are only going to have two new major fighter programs over the next fifty years -- the F-22 and the products of JAST. Their potential for derivatives will leverage our investment by meeting the Air Force's diverse future mission needs as well as the needs of our sister services and allies.

We have $18B invested in F-22 research and development, so it is essential that we maximize our return on investment. The F-22's inherent design will allow it to spin off a family of derivatives that can assume a wide variety of joint service missions.

The initial F-22 aircraft will possess basic ground attack capability with JDAM. A multi-role derivative -- similar to the F-15E -- could have a more robust air-to-ground capability. We could also tailor other derivatives to perform electronic combat and reconnaissance, and perhaps develop a Navy variant if they should decide to buy a high-end, long-range replacement for their attack aircraft.

Beyond the turn of the century, we will need an affordable replacement for nearly 2,000 F-16s, and our sister services and allies will need replacements for their aging fleets of strike fighters as well. The JAST program will meet these needs.

Because we will have the dominant requirement, the JAST program will produce a "family" of affordable strike aircraft that are derivatives of the Air Force's Conventional Takeoff and Landing variant. The Marine requirement for a short takeoff and landing aircraft will add new propulsion technology to the USAF version, and should the Navy

decide that it needs an affordable low-end replacement for its F-18s, the JAST program can produce a third variant that meets that need.

In addition, there are lots of aging export fighters around the world that will have to be replaced. JAST can produce an export variant of our USAF baseline aircraft, minus the most sensitive technologies, that can compete in the global market with export fighters from France, Russia, and possibly Japan. In our new defense environment, foreign military sales will become increasingly important as we strive to maintain access for our deploying forces, maintain interoperability with our likely Coalition partners, and preserve our fighter industrial base. JAST is our only hope for such an aircraft.

The JAST program can be the defining program for our new aerospace industry of the 21st century. It will capitalize on our acquisition reform initiatives to include greater use of commercial practices and lean manufacturing and production. I think of this as the "Saturn approach" used effectively by General Motors to develop a new culture for automobile production. The JAST approach will create a new culture in the aerospace companies of tomorrow.

CONCLUSION

In conclusion, let me reiterate that our new security environment places a new premium on responsive and sustainable combat airpower. Our high-value bombers and fighters, mated with advanced munitions, are the most potent and versatile elements of our joint airpower team that will deliver the bulk of combat airpower in any major regional conflict.

To retain our overwhelming advantage well into the future, we are upgrading our existing systems when it is cost effective to do so, but we are also leveraging our

investment in revolutionary new technologies that pay tremendous dividends in new combat capability or cost savings -- the F-22 and JAST will do both.

The F-22 is my number one modernization priority because it will guarantee our air superiority in tomorrow's campaigns, and its derivatives will have the multi-role potential to meet tomorrow's needs for a high-end ground attack and electronic combat fighter. In addition, F-22 derivatives can meet the Navy's demand for a high-end stealthy fleet defense and strike aircraft.

The JAST program will produce the affordable replacement we will need for nearly 2,000 F-16s, and its derivatives will offer our sister services and allies a low-end replacement for their aging ground attack fighters as well.

Today we can take pride in having the world's finest Air Force. Our fighter modernization strategy will make us even more effective and efficient in the coming years -- allowing us to pursue new operational strategies, retain our overwhelming superiority, and give Americans the greatest return on their defense dollar.

I'd like to thank the members of the committee for your long-standing support of our nation's defense and request your continued, future support for airpower adequate to meet our defense needs in a turbulent world.

Thank you.

Mr. HUNTER. Without objection.

General Campbell, thank you. I am informed General Loh will be here very shortly in time for our questions.

Gentlemen, thank you. We are now going to go through a somewhat unusual exercise here. To complete the picture with respect to our defense needs and the industrial base's capability to supply them, we are now replacing your name plates with the name plates of gentlemen who represent the industry.

I would ask you before we get to the question period to exchange chairs with our industry representatives. We want them to make an opening statement, a response if you will, to the military's projected requirements. At that point we will bring you back and go to questions.

If we have all of the name plates out now, could Mr. Hardison, Mr. Palaschak, Mr. Flater, Mr. Rabaut, Mr. England and Mr. Fitzgerald come forward?

I want to thank our service representatives for their opening statements.

Gentlemen, thank you for being with us. You have had a chance to listen to our service requirements leaders. Of course, you are familiar with the projected requirements under this President's budget.

I would ask each of you to give us an opening statement with respect to your perspective on your portion of the industrial base's capabilities and what you see for your portion of the industrial base under these requirements and into the future. Why don't we just start from my right and go left. Duane Fitzgerald is chairman of the American Shipbuilding Association. He is also president and CEO of Bath Iron Works. Welcome. Mr. Fitzgerald, the floor is yours.

STATEMENTS OF DUANE D. FITZGERALD, CHAIRMAN, AMERICAN SHIPBUILDING ASSOCIATION, PRESIDENT AND CEO OF BATH IRON WORKS

Mr. FITZGERALD. Thank you very much, Chairman Hunter, Chairman Weldon, and members of the committees. I appreciate the opportunity to be here with you this morning on behalf of the American Shipbuilding Association and on behalf of my company in Maine, Bath Iron Works Corp.

Let me say a thing or two about the American Shipbuilding Association. It was formed last November. It consists of the six large American shipyards: Avondale Industries, whose president I am pleased to say, Al Boushay, is here with me this morning; Bath Iron Works, as you know; Electric Boat in Connecticut; Ingalls Shipbuilding in Mississippi. I am pleased to say that its chief executive officer [CEO], Jerry St. Pay, is also with me this morning; the National Steel and Shipbuilding Co. in San Diego; and Newport News Shipbuilding in Virginia.

Among us, we design and build all of the complex combatants for our Navy. No one else can do it. We organized the American Shipbuilding Association last November in order to speak with a more coherent voice than had been the case for our industry in our opinion in previous years.

We think the time is right for us to speak much more clearly and much more coherently about the threat to the shipbuilding industrial base. There are two reasons to be concerned about shipbuilding.

The first is that we must preserve the unique highly specialized skills that these shipyards possess. I have already indicated we build all of the Navy's complex ships. They are the most sophisticated, the most capable, the most survivable ships in the world.

The second reason to be concerned about shipbuilding is jobs. Of our six members, four are the largest employers in the States in which they operate; Maine, Connecticut, Louisiana, and Mississippi. In California, we are also a very large employer and, of course, in Virginia, we are the largest employer. So, jobs is the second reason to be concerned.

Each of these shipyards has lost jobs in the last 3 or 4 years, now measured in thousands. My own shipyard has lost over 3,000 since 1990. In order to retain this unique capability that we have, we are doing several things to survive.

First of all, we are reducing costs of operations everywhere. We are reducing overhead costs. We are becoming more efficient in our production activities. I think the Navy would attest that its ships are being bought at very favorable prices.

Second, we are trying to supplement our Navy workload. I would note that "supplement" is the key word. We do not intend to leave naval shipbuilding, but in order to stay in naval shipbuilding, we must find a way to supplement the work that we are doing.

With the exception of Electric Boat, which is engaged in building submarines as you know, each of the other members of the American Shipbuilding Association have been working very diligently to try to reenter the commercial shipbuilding market.

We have engaged in various activities. My own company has a focused commercial shipbuilding development project underway in which we are working with a European shipbuilder, a Japanese shipbuilder, along with two ship operators to try to determine what those best practices are that are being employed by those shipyards which make them so efficient and so competitive in the world commercial market.

We are struggling to reenter that market. No one should assume that that's going to be easy. No one should assume that that's the savior for naval shipbuilding in this country. It is only a supplement. It will only help us preserve the capabilities that we have.

I would urge upon you four things. To explore every alternative available to fund additional ships. As Admiral Lopez has indicated in his testimony, we are building and delivering but a fraction of the ships that we were building and delivering just a few years ago.

I would urge you to continue your support for title XI loan guarantees essential to the slim chance I think we have of reentering the commercial shipbuilding market. I would urge you to continue to support the Maritech Program.

I would urge you to look carefully at defense sealift and see to it that we only spend money on sealift ships constructed in U.S. shipyards. We should not authorize any funds to purchase second-

hand ships from subsidized shipyards or built in subsidized shipyards for our defense needs.

Finally, I would urge upon you very careful examination of the OECD Shipbuilding Trade Agreement. We think that agreement in its current form not to be in the interest of this country and not in the interest of the shipyards of this country.

I understand that there are some shipyards that think the agreement is satisfactory. I would urge upon you to take note that the six shipyards that build all of the ships for the Navy, who employ over 90 percent of the people working in shipbuilding in this country, think the agreement will not meet its objectives. So, I would encourage your very close examination of that.

In closing, Mr. Chairman, I noted that Admiral Lopez talked about forward from the sea as describing the Navy's approach to the problems that it is confronting. I would simply say that in order to go forward from the sea, we need to be able to go to sea. I think our ability to go to sea is threatened.

Thank you very much.

March 7, 1995 Testimony of Duane D. Fitzgerald,
Chairman, American Shipbuilding Association

Thank you for affording me the opportunity to testify today in my capacity as Chairman of the American Shipbuilding Association (ASA). ASA represents America's six major Naval shipbuilders which employ approximately 95 percent of all shipbuilding workers in the United States.

In addition to Bath Iron Works - the proud Maine shipyard I have the honor to lead as President and Chief Executive Officer, the other five member companies of the American Shipbuilding Association are: Avondale Shipyards in Louisiana, General Dynamics' Electric Boat Division in Connecticut, Ingalls Shipbuilding in Mississippi, National Steel and Shipbuilding in California, and Newport News Shipbuilding in Virginia.

ASA member shipbuilding yards are the largest private employers in four states and among the largest private employers in two other states. In addition, the US Navy shipbuilding programs in which ASA member are engaged are also the major source of business for thousands of firms, large and small, throughout the United States that make up our critical naval supplier base.

ASA member shipbuilders build <u>all</u> the US Navy's current complex combatants and large amphibious and auxiliary ships, including: AEGIS Guided Missile Destroyers; Aircraft Carriers; Amphibious Assault Ships; Amphibious Landing Ships; Attack Submarines; Fast Ammunition Supply Ships; Fleet Oilers; Strategic Sealift Ships; and TRIDENT Submarines.

In recent years, the Navy Shipbuilding and Conversion budget has declined sharply. The FY'94 Navy shipbuilding budget represented about a 65% reduction compared to the FY'89 budget. This year's Shipbuilding Request contains only three Navy combatant ships. The FY'97 Navy shipbuilding budget again contains just three Navy combatants. And yet, to even sustain the 346-ship Navy Fleet endorsed by the Defense Forces Bottom-Up Review, an average annual Navy procurement of 10-ships is required based on the retirement of older, less capable, ships and the projected service life of ship classes. In addition to combatant ships, there is a long-term Joint Services requirement for a modern, quick-reaction US strategic sealift fleet. That requirement was demonstrated convincingly in Operations Desert Shield and Desert Storm. Funding for the construction of two Sealift Ships is included in the FY'96 budget.

To demonstrate how precipitous the decline in Navy shipbuilding has already been, one must keep in mind that Navy ships take years to build. While twenty-three Navy ships are scheduled to be delivered by US shipbuilders during 1995 - only twelve ships are scheduled to be delivered to the Fleet in 1997. That is the irreversible result of decisions made three and four years ago. Similarly, decisions made this year will have ramifications for the Navy and this vital industry for many years to come.

The 1982 US Maritime Administration report on the US shipbuilding industry identified 37 shipyards capable of constructing ocean-going ships at least 400-feet long. The 1993 report identified only 19 such facilities, of which only 10 were then engaged in major ship construction. The 1994 MarAd report notes that total US shipbuilding industry employment is "currently projected to be lower than at any point in the last 39 years."

DoD's report last year on the Adequacy of the US Shipbuilding Industry noted: "For the longer term, the ability of the US shipbuilding industry to meet military requirements is problematic." A Naval Industrial Preparedness War Game conducted last year projected that - with the expected continued decline of the US defense shipbuilding industrial base, this nation was likely to find itself unable after 2001 to reconstitute the Navy Fleet to the 1991 Base Force level of 450-ships despite a national security requirement to do so in time to meet an emerging global threat to US interests.

In spite of the reduced Navy shipbuilding budget, ASA members have implemented aggressive cost reduction programs. We are also committing resources to enter international commercial and naval markets. We do so not because we have any desire to leave the nation's defense industrial base. To the contrary, by doing so, we hope to sustain the unique defense capabilities the six major shipbuilding yards possess to meet the Nation's future defense requirements.

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The skills, facilities, and experience required to design, construct, integrate, and deliver complex naval ships have taken decades, and hundreds of millions of dollars to develop and maintain. To even partially re-create these facilities at a later date would require years and billions of dollars in new federal expenditures. Once established, it would then be years later before such facilities and their workers could construct and deliver complex warships at acceptable costs and performance standards comparable to those being delivered today.

Concerted action must be taken to halt any further loss of the currently active US defense shipbuilding base. The Naval War Game and the DoD Report on Shipbuilding both emphasized the important role that commercial shipbuilding and other supplemental work could have in helping to sustain our shrinking defense shipbuilding base. While there has been some progress in those areas, serious obstacles remain, and must be addressed.

These recommendations represent actions this committee can take to assist the US defense shipbuilding industrial base:
(1) Increase the Navy Shipbuilding account to meet and sustain currently projected naval force structure requirements. Relying on a major ramp-up at decade's end is unrealistic, increases the costs of required ships, and endangers today's active Navy shipbuilding base. To avoid that outcome, every alternative should be explored to fund additional required ships.

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(2) The National Shipbuilding Initiative's Title XI loan guarantee and MARITECH technology development programs have helped position US shipbuilders for the commercial market. While they alone do not provide the total solution, they are working and merit continued funding.

(3) Ships required for national defense sealift should be modern, dependable, and constructed in US shipyards. No federal funds or statutory authority should be provided for the procurement of used foreign-built merchant ships for our nation's defense.

(4) Members of Congress, the American Shipbuilding Association, and other affected parties, have grave concerns with the recently negotiated OECD commercial shipbuilding trade agreement. We encourage this committee to carefully examine the Agreement's implementing legislation and determine if the Agreement serves the national security interests of the United States.

The members of the American Shipbuilding Association appreciate your concern and support. We look forward to working with you and your colleagues.

Mr. HUNTER. Thank you, Mr. Fitzgerald, for a very excellent statement. Now, Mr. Gordon England, president, Lockheed Fort Worth Co. Mr. England, the floor is yours. Thank you for being with us.

STATEMENT OF GORDON R. ENGLAND, PRESIDENT, LOCKHEED FORT WORTH CO.

Mr. ENGLAND. Mr. Chairman and distinguished members, it is a pleasure to be here this morning to represent the fighter aircraft industry. I would like to provide you perhaps a perspective. I did some mental calculations while the four military leaders were giving testimony.

The procurement budget for the whole U.S. military is equal to about 3 or 4 months sales for the General Motors Corp. It is interesting to me that we debate a million or a billion dollars. In the context, frankly of, our economy and our industrial output, our procurement for the U.S. military is incredibly low.

It is even more stark when you consider the industry I represent. For the very first time, fiscal year 1995 was the first time in the history of the U.S. Air Force, since 1947, there were no fighters in the budget. I would remind you that 1947 was not exactly a threat environment we were in at that time. We were demobilizing, but still producing airplanes; none in fiscal year 1995.

I would like to give you a little historical perspective. In 400 B.C., Plato made his famous statement, "Only the dead have seen the end of war." Recently, I was in the British War Museum and saw a display. It emphasized the fact that in this century alone, this one century, over 100 million people have been killed in war.

Frankly, I think over that perspective of time it is naive to think that we will not be engaged in future combat. Now we tend to talk about nation-building and peacekeeping. The reality is, we have a military to fight a major war when the United States needs to do so and we will not have time to build up that military when that time comes.

Of course, air power is a critical component when that need arises. What is necessary, frankly, is that we produce systems that are affordable in peacetime. Otherwise, they will not be available in wartime. To be affordable, it is imperative that the DOD, the military and the industry infrastructure be drastically reduced.

Moneys can be made available for procurement, frankly, if we simplify the rules and regulations by which we do business. Another perspective I would like to give you, as you travel around the world, it is very interesting to me to see the industry, aerospace industry, being built up all around the world as it declines here in the United States.

I am not sure all of the legs of the stool is for a modern industrial economy, but certainly two of those legs are communication and transportation. Within transportation, aerospace, and particularly military aerospace is critical because it is the high-end technology that makes all of the rest of it possible.

While on the subject of foreign competition that is growing, I would like to mention that our sales have shifted rather dramatically. On the F–16 program, during the period 1978 to 1993, we

were 63 percent domestic. Between now and the year 2000, we will be 15 percent domestic.

It is not an issue. I know people worry about being foreign-owned. We are definitely foreign-dependent. I mean, we do rely on foreign sales. Frankly, that's not bad. The bad part is, is that there are parts of the world that we are not allowed to compete in that could be very beneficial, I think, to us and to various other countries under our policy.

When we loose sales, the Government and the military loose leverage, influence, and control. A lot of people have left our industry. They have left, we know, in our region. We have done a lot of surveys that they get other jobs. We also know, on average, that they get paid 25 percent less when they go to other types of industries.

While unemployment has not gone down a measurable amount during this decline in our business, incomes have indeed gone down. I think that is probably what you are hearing from your constituents.

It is very, very hard for us to maintain competency as our base goes down dramatically. We do need a core competency to do fighter airplane design. I would like to give you some interesting statistics.

If you had been an aerospace engineer and you graduated in the 1950's, then during your career period, you would have had the opportunity to work on 84 military airplanes. If you had graduated in the 1960's, then that would have dropped to 40 military airplanes. In the 1970's, to 11. If you graduated in the 1990's, the only new military airplane is the F–22 in development today and maybe perhaps in the future the JAST that you heard mentioned in the testimony.

So, between now and the year 2020, there is really one new airplane, maybe, to be developed. Now the question is, how do you maintain the capability when we are building in a whole lifetime two different military airplanes? Literally, the "seed corn" is being eaten.

Our young people in the universities understand that they cannot get jobs in aerospace. Therefore, they are leaving. Aerospace curriculums are dropping at every major university in the country.

Speaking for the industry, I want to make a few recommendations. First, we need at least a nominal production rate; low-rate production of the current fighters. We need that because we do need some production. We also need upgrades for the fielded fighter airplanes that we have today.

Again, in my view if we can reduce infrastructure, I think some of those moneys can be made available from infrastructure reductions. Second, I would recommend that we go back to building some prototype airplanes that we did in the past.

We used to have lots of *x*-models, et cetera, a variety to extend our technology, our whole base that our industry grew on, the whole aerospace grew on. I will give you one data point. In the 1970's, we built two F–16 prototypes. The total dollar value was less than $40 million.

That was two airplanes built and went through a complete flight test program. If you take those dollars forward, that is maybe $250

or $300 million. Even if you put in new technologies, it is maybe $500 million, which means for a billion dollars a year, we could have a technology base of building airplanes, two different airplane varieties, on a continuing basis to keep our technology base alive.

Third, I would recommend that the Government and U.S. military encourage foreign sales because it does benefit both our industry and our country.

Fourth, again, the nonvalue-added infrastructure cost needs to be reduced.

Fifth, we would like to be able to participate on a broader scale on the front-end research and development [R&D] and also the modification and depot work in the aftermarket.

So, they are my recommendations. I look forward to the questions and answers. Mr. Chairman, thank you for the opportunity to be here today.

COMMENTS BY GORDON R. ENGLAND
BEFORE THE NATIONAL SECURITY COMMITTEE
MARCH 7, 1995

It's a pleasure for me to be here today to represent the fighter aircraft industry. It was interesting for me to listen to the testimony from our four military services. As they were providing their testimony, I was making some mental calculations and determined that the entire United States military procurement budget is about equal to three months' production for the General Motors Corporation. Frankly, I find that to be quite startling. We debate whether we can afford another million or so in our procurement accounts, and yet our procurement expenditures are incredibly low compared to our economy and to our commercial output.

It's even more stark when you consider the industry I represent. For example, FY95 is the first time since the beginning of the USAF (in 1947) that no USAF fighters are in the budget.

In the year 400 BC, Plato made his now famous statement, "Only the dead have seen the end of war." Several months ago I was in the British War Museum and viewed a display that's hard to forget. In this century alone (the 1900s) 100 million people have been killed in war. Over the perspective of time from Plato to the present, it would certainly be naive to think that the U.S. will not be

engaged in future major warfare. It's now popular to talk about our military in terms of peace-keeping and nation-building. Perhaps we are deceiving ourselves and our future generations who will ultimately pay. The overriding imperative for the nation and for the defense industry is to have a military ready to fight when needed and airpower will be a critical component. To do so, we need to produce systems that are affordable in peacetime; otherwise, we will not have systems available for war. To be affordable, it is imperative that DoD, military and industry infrastructure be drastically reduced. Even though industry is far ahead in these cuts, actions to greatly simplify the procurement rules and regulations are essential for all infrastructure costs to reach a reasonable and affordable level.

As my fighter aircraft counterparts and I travel about the world, it is ever more evident that many nations in the world are building the foundation for a future aerospace industry. These nations seem to have a motivated populace, improving schools and students willing to sacrifice and to learn so they can compete effectively in the future. It appears to us that other nations are getting stronger in aerospace as we grow weaker. Other countries seem to recognize that communication and transportation are the two necessary components of any modern economy and that within transportation, military aerospace is the most vital since almost all of the high-end new technology is in this area.

While on the subject of foreign competition, we can't lose sight of the fact that our industry is more and more dependent on foreign sales. For example, the F-16 has gone from 63% domestic and 37% foreign in 1978-1993 to 15% domestic and 85% foreign in 1994-2000. Many in the Government express concern about our defense business being foreign-owned. Frankly, that is not an issue. But we should certainly recognize that our fighter airplane industry is definitely foreign-dependent. That's not necessarily bad, and in fact won't change, even if the U.S. military increases their procurement. Rather, the Administration should look very carefully at what, in our view, are far too restrictive export policies. In some places in the world, we are prohibited from competing. Our industry loses sales and our Government and military lose leverage, influence, and control.

Concerns about employment are justified. As you are aware, defense related employment has declined from 3.7M to 2.6M since 1987. It is projected to go to 1.5M in about three years. These numbers reveal that we are not at the bottom of the defense decline. Although appropriations may be stabilizing, our industry is still existing on outlays from prior years. It takes about three years for outlays to pass through the system and that's why employment will continue to go down.

We know that many people who have been terminated from the defense industry obtain lower paying jobs. The message congressional personnel receive from their constituents is correct. While the nation's unemployment rate has not increased as defense employment decreased, worker's income has decreased. Studies in my area of the country reveal a salary drop of about 25-30% when people transition out of the Lockheed fighter factory in Fort Worth.

It is very difficult to maintain competency in fighter design as our business base declines. As employment declines, the average age of our fighter industry workforce is increasing. We are losing skills at an alarming rate through voluntary exits and retirements . As such, it is very difficult to maintain competency in fighter unique areas as our business base declines. Our industry requires a critical mass of competency. For example, in flight control technology, we need engineers and software people knowledgeable of unique fighter airplane control laws, redundancy design, aerodynamics, simulations, etc., etc. The commercial airplane industry does not contain these skills. Also keep in mind that even at our peak in 1985, we were dropping from an already low base in terms of aeronautical experience. By way of background, an aeronautical engineer who started his career in the 1950s would have had 84 military airplane design opportunities during his career lifetime. In the 1960s, that had dropped to 40

military airplane designs. In the '70s, to 11 designs. Today, it is quite likely that an aeronautical engineer will work on one or maybe two military airplane designs in his career lifetime. Other than the F-22, the only new airplane on the horizon is maybe JAST.

How do our experts maintain skills when they only have one or two design opportunities in a lifetime? Recognize that the "seed corn" of our business is drying up. Aeronautical enrollment at our universities is down. Students are keenly aware of the job outlook and are moving into other fields.

Speaking for the fighter aircraft industry, I recommend that we maintain at least a nominal production rate of current fighters for our nation's military and have upgrade programs for fielded fighter aircraft. Secondly, I recommend that the U.S. Congress and the military services make monies available for development of prototype airplanes to extend our aerodynamic knowledge and to maintain our technical capabilities. In the early 1970s, General Dynamics built two F-16s and conducted an entire flight evaluation for a cost under $40M. That cost today would be about $250M in constant dollars. Even for more complex airplanes, we could still have two or more airplanes always in the design and development phase for less than $1B a year. Third, I recommend that all U.S. Government agencies and the U.S. Military encourage foreign sales for the benefit to our industry and to our country. Fourth,

tactical military airplanes are burdened with non-value infrastructure costs that need to be reduced through initiatives already started in the DoD and by further reduction and elimination of non-value rules and regulations. Fifth, if American defense industries are to be expected to be prepared for relatively infrequent production opportunities, they must be allowed to participate on a broader scale in the front-end R&D efforts and the modification/depot work in the aftermarket.

With domestic procurement and upgrades, expanded international sales, advanced prototypes to maintain our design skills, and a lower cost environment in which to compete, our fighter industry can maintain a viable base and serve the Nation's interest. We solicit your support.

Mr. HUNTER. Thank you, Mr. England, for a very complete statement. Now, Mr. Thomas Rabaut, president and CEO, United Defense LP.

STATEMENT OF THOMAS W. RABAUT, PRESIDENT AND CEO, UNITED DEFENSE

Mr. RABAUT. Mr. Chairman and members of the subcommittees, it is a pleasure for me to respond to your request to testify before you as the spokesman for the tracked combat vehicle sector of the defense industrial base.

In particular, I appreciate having the opportunity to testify along with the services' senior users who establish military requirements and are our ultimate customers. I understand that you want me to give you my candid assessment of whether our portion of the rapidly downsizing defense industry can adequately respond to those requirements now and in the future.

I will do my best to do that. My prepared statement has been delivered to your committees. I request that it be entered into the record and, with your permission, I will proceed to give a short summary at this time.

Mr. HUNTER. Without objection.

Mr. RABAUT. Let me begin by pointing out that I am speaking from the perspective of the developer, system integrator, and manufacturer of most of the U.S. ground combat systems. The major exception is the Abrams tank and the heavy assault bridge which are General Dynamics Land Systems Division products.

As full service prime contractors, though, we must be ever mindful of the health and quality of our many subcontractors and suppliers, without whom we cannot properly do our job. As ground combat and amphibious assault vehicles become more sophisticated with more and more electronic content, our supplier mix has changed significantly.

The tracked combat vehicle portion of the defense industrial base is being driven by two major changes; the major reduction of our Nation's national security budget and the redefining and reshaping of our forces. This military renaissance demands significant adaptation of advanced technologies that are becoming available for application to combat vehicle systems.

In my view, we cannot afford to forego these high leverage improvements to land combat systems over the next few years. Now, I would like to give you a brief report on what has been going on in our industry segment over the past few years to respond to these two drivers.

The combat vehicle industrial base that supported the cold war and Desert Storm is gone. Thousands of employees, 10,000 in United Defense alone, hundreds of machine tools, and hundreds of thousands of manufacturing square footage is gone. We are not a smaller version of the cold war base. We are a different industrial base.

It is a base striving to consolidate so that significantly smaller volumes of vehicles can be designed, developed, and produced economically. There are no new tanks, Bradleys or artillery pieces being built today. Today we are only doing upgrades to existing programs.

All of us in the industry who have chosen to stay in the defense business have had to take drastic management actions to survive and meet our customers' needs.

For example, we flattened and reengineered our company, using TQM principles in order to get rid of excess capacity and overhead. This allowed us to hold the price of our production constant at roughly half the production rate.

To significantly cut costs, FMC and HARSCO combined their defense businesses to form a new company, United Defense, which I now head. Our customers are already realizing the benefits of this action.

United Defense adopted a major strategic thrust to maintain leadership in the advanced technologies that are key to extending the useful life of our current products and to serve our customers' needs for future combat systems.

We have formed win-win partnerships with the Army's depot system in order to make the best use of both public and private facilities. Elsewhere, General Dynamics, the operator of the Government tank plant, has stated there is a minimum sustaining rate of 120 rebuilt tanks a year. The current budget does not support this.

With all of that as background, I would like to give you my personal assessment of our ability to respond to our customers' requirements. First, I can say unequivocally that the base today is positioned to serve our customers' currently stated needs.

It has been United Defense's goal to build a flexible efficient base that will allow our customers to spend their money on their highest priority requirements and not have to worry about investing in unneeded items solely to sustain the industrial base.

Having said the above, it is quite clear to all of us in the defense business, that the services' modernization budgets are woefully inadequate to meet the goals that they have set for themselves to transition to the 21st century.

Examples include 2,000 first generation Bradleys required, even for the significantly reduced Army that are technically unfit for combat. Even today armor units are without recovery vehicles that can handle the M1A1 tank. This is for an Army that will soon fall to No. 8 in size in the world.

The Navy's "from the sea" mission will go unsupported by an adequate amphibious assault vehicle for years, and the list goes on.

Every Defense official from Secretary Perry on down has stated that there is a short-term problem with research, development and acquisition spending. The readiness of our force in the year 2000 depends on a more robust set of life extension programs than is now funded. The health of the base to develop and field our next generation of combat vehicles will depend on a relatively stable acquisition of things that are clearly needed in the interim.

Now, I would like to be presumptuous enough to suggest a few things that the committees and the Congress can do to help maintain the readiness and health of the industrial sector of the services' tracked combat vehicle capabilities.

First and foremost, ensure that funding for tracked combat vehicle programs meet the services' actual requirements for modernization and long-term readiness. These requirements exceed what has

been deemed affordable in the President's budget. If this is done, our industrial base will automatically remain viable.

Support Secretary Perry's initiatives for acquisition reform. There are huge savings to be realized if you help him get rid of outdated and inefficient business practices.

Support the DOD's efforts to rationalize its new depot policy with the Congress. Proper partnering with industry will provide a win-win solution to the public-private balance in the industrial base.

Help us take advantage of section 114 of the fiscal year 1993 Authorization Act. It makes so much sense to be able to use the proceeds from FMS sales to upgrade the equipment in the hands of our forces.

Finally, where the services are truly benefited, approve the use of multiyear contracting to ensure program and business stability.

Thank you for allowing United Defense and me to speak for the industrial members of the tracked combat vehicle industry.

STATEMENT BY
THOMAS W. RABAUT
PRESIDENT AND CEO, UNITED DEFENSE LP
BEFORE THE
HOUSE NATIONAL SECURITY SUBCOMMITTEES
FOR
PROCUREMENT AND RESEARCH AND DEVELOPMENT

MARCH 7, 1995

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEES, IT IS A PLEASURE FOR ME TO RESPOND TO YOUR REQUEST TO TESTIFY BEFORE YOU AS THE SPOKESMAN FOR THE TRACKED COMBAT VEHICLE SECTOR OF THE DEFENSE INDUSTRIAL BASE. IN PARTICULAR, I APPRECIATE HAVING THE OPPORTUNITY TO TESTIFY ALONG WITH THE SERVICES' SENIOR USERS WHO ESTABLISH MILITARY REQUIREMENTS AND ARE OUR ULTIMATE CUSTOMERS. I UNDERSTAND THAT YOU WANT ME TO GIVE YOU MY CANDID ASSESSMENT OF WHETHER

OUR PORTION OF THE RAPIDLY DOWNSIZING DEFENSE INDUSTRY CAN ADEQUATELY RESPOND TO THOSE REQUIREMENTS NOW AND IN THE FUTURE. I WILL DO MY BEST TO DO THAT.

LET ME BEGIN BY POINTING OUT THAT I AM SPEAKING FROM THE PERSPECTIVE OF THE DEVELOPER, SYSTEM INTEGRATOR AND MANUFACTURER OF MOST OF THE U.S. GROUND COMBAT SYSTEMS. THE MAJOR EXCEPTION IS THE ABRAMS TANK AND THE HEAVY ASSAULT BRIDGE WHICH ARE GENERAL DYNAMICS LAND SYSTEMS DIVISION PRODUCTS. AS FULL SERVICE PRIME CONTRACTORS, THOUGH, WE MUST BE EVER MINDFUL OF THE HEALTH AND QUALITY OF OUR MANY SUBCONTRACTORS AND SUPPLIERS-- WITHOUT WHOM WE CANNOT PROPERLY DO OUR JOB. AS GROUND

COMBAT AND AMPHIBIOUS ASSAULT VEHICLES BECOME MORE SOPHISTICATED WITH MORE AND MORE ELECTRONICS CONTENT, OUR SUPPLIER MIX HAS CHANGED SIGNIFICANTLY. I CAN ASSURE YOU THAT AS WE HAVE RESHAPED TO RESPOND TO THE BUSINESS ENVIRONMENT CREATED BY THE RAPIDLY CHANGING DEFENSE MARKETPLACE, WE HAVE INCLUDED, AS A HIGH PRIORITY, SIGNIFICANT IMPROVEMENTS IN THE WAY WE MANAGE OUR SUBCONTRACTORS.

THE TRACKED COMBAT VEHICLE PORTION OF THE DEFENSE INDUSTRIAL BASE IS BEING DRIVEN BY TWO MAJOR CHANGES -- THE MAJOR REDUCTION OF OUR NATION'S NATIONAL SECURITY BUDGET AND THE REDEFINING AND RESHAPING OF OUR FORCES. THIS MILITARY RENAISSANCE DEMANDS SIGNIFICANT

ADAPTATION OF ADVANCED TECHNOLOGIES THAT ARE BECOMING AVAILABLE FOR APPLICATION TO COMBAT VEHICLE SYSTEMS. AS YOU HAVE HEARD FROM THE MILITARY WITNESSES HERE TODAY, OUR EVOLUTION TO THE 21ST CENTURY IS DRIVEN PRIMARILY BY SENSORS, COMPUTERS AND DIGITAL COMMUNICATIONS SYSTEMS THAT ALLOW HERETOFORE UNDREAMED OF SITUATIONAL AWARENESS ON THE BATTLEFIELD. KNOWING ABOUT YOUR ENEMY AND ABOUT YOUR OWN FRIENDLY FORCES, LETS OUR COMMANDERS WIN WITH MINIMUM CASUALTIES. IN MY VIEW, WE CAN'T AFFORD NOT TO AFFORD THESE HIGH LEVERAGE IMPROVEMENTS TO LAND COMBAT SYSTEMS OVER THE NEXT FEW YEARS.

NOW, I WOULD LIKE TO GIVE YOU A BRIEF REPORT ON WHAT HAS BEEN GOING ON IN OUR INDUSTRY SEGMENT

OVER THE PAST FEW YEARS TO RESPOND TO THESE TWO DRIVERS.

THE COMBAT VEHICLE INDUSTRIAL BASE THAT SUPPORTED THE COLD WAR AND DESERT STORM IS GONE. THOUSANDS OF EMPLOYEES, 10,000 IN UNITED DEFENSE ALONE, HUNDREDS OF MACHINE TOOLS, AND HUNDREDS OF THOUSANDS OF MANUFACTURING SQUARE FOOTAGE IS GONE. WE ARE NOT A SMALLER VERSION OF THE COLD WAR BASE -- WE ARE A DIFFERENT INDUSTRIAL BASE. IT IS A BASE STRIVING TO CONSOLIDATE SO THAT SIGNIFICANTLY SMALLER VOLUMES OF VEHICLES CAN BE DESIGNED, DEVELOPED AND PRODUCED ECONOMICALLY. CURRENTLY THERE ARE NO NEW TANKS, BRADLEYS OR ARTILLERY PIECES BEING BUILT. ALL NEW EQUIPMENT ARE UPGRADES.

AT GENERAL DYNAMICS, THE OPERATOR OF THE GOVERNMENT TANK PLANT DESIGNED TO MANUFACTURE 120 NEW SYSTEMS PER MONTH, THE MINIMUM SUSTAINING RATE IS 120 REBUILD PER YEAR IF IT IS ROUGHLY MATCHED WITH A LIKE QUANTITY IN OVERSEAS SALES. THIS IS AFTER APPROPRIATE PERSONNEL DOWNSIZING.

AT UDLP, THE PROBLEM IS MORE COMPLEX WITH ITS MULTIPLE PRODUCT LINES AND MULTIPLE, PRIVATELY OWNED FACILITIES.

WITHOUT BORING YOU WITH DETAIL, LET ME HIGHLIGHT THE MAJOR ACTIONS TAKEN AND THEIR RESULTS:

- WE HAD A MAJOR EFFORT TO STREAMLINE INTERNALLY WHICH INCLUDED FLATTENING OUR ORGANIZATION AND USING TQM PRINCIPLES TO IMPROVE BOTH EFFICIENCY AND QUALITY. THIS ALSO INCLUDED IMPROVING OUR SUPPLIER MANAGEMENT SYSTEM, INTRODUCING FLEXIBLE MANUFACTURING, AND CLOSING EXCESS CAPACITY. THE RESULT OF THESE CHANGES ALLOWED US TO HOLD THE PRICE OF BRADLEY FIGHTING VEHICLES CONSTANT WHILE REDUCING THE RATE BY 50 PERCENT.

- TO SIGNIFICANTLY CUT COSTS, FMC AND HARSCO COMBINED THEIR DEFENSE BUSINESSES AND FORMED A SEPARATE COMPANY CALLED UNITED DEFENSE LP. THE CUSTOMER IS ALREADY REALIZING THE BENEFITS OF THIS ACTION. THERE IS PROGRAM SYNERGISM,

PARTICULARLY IN THE ARTILLERY AREA. THERE ARE SAVINGS FROM FACILITIES CONSOLIDATION, AND WE HAVE A COMBINED BUSINESS BASE THAT ALLOWS US TO SUPPORT OUR CUSTOMERS' NEEDS FOR A PRIME CONTRACTOR WITH THE ENGINEERING SKILLS FOR R & D, SYSTEMS INTEGRATION, TECHNOLOGY INFUSION AND LIFE CYCLE SUPPORT. AS TWO SEPARATE COMPANIES, WE WOULD BE UNABLE TO DO THIS TODAY.

- UNITED DEFENSE ADOPTED A MAJOR STRATEGIC THRUST TO MAINTAIN A LEADERSHIP POSITION IN THE ADVANCED TECHNOLOGIES THAT ARE KEY TO EXTENDING THE USEFUL LIFE OF OUR CURRENT PRODUCTS AND TO SERVE OUR CUSTOMERS' NEEDS TO DEMONSTRATE AND VALIDATE OPTIONS FOR

FUTURE COMBAT SYSTEMS. AS A RESULT, WE HAVE WON AND ARE ACTIVELY EXECUTING TECHNOLOGY PROGRAMS FOR COMPOSITE VEHICLES, DIGITIZATION OF THE BATTLEFIELD, ACTIVE DEFENSE FOR VEHICLE SURVIVABILITY, AND ADVANCED AMPHIBIOUS ASSAULT VEHICLE TECHNOLOGY.

- WE DECIDED TO FORM WIN-WIN PARTNERSHIPS WITH THE ARMY'S DEPOT SYSTEM IN ORDER TO MAKE THE BEST USE OF BOTH THE PUBLIC AND PRIVATE CAPABILITIES . THE WORK SHARE HAS DEPOTS DOING WHAT THEY DO BEST (TEAR DOWN AND REBUILD) AND THE PRIME CONTRACTORS DOING THE UPGRADES THAT REQUIRE INTEGRATION OF ADVANCED TECHNOLOGY. OUR PARTNERSHIP WITH LETTERKENNY ARMY DEPOT FOR THE M109A6 PALADIN SELF

PROPELLED HOWITZER PROGRAM BROKE NEW GROUND AND HAS BECOME A SHOWCASE OF EFFICIENCY. GENERAL DYNAMICS LAND SYSTEMS HAS A SIMILAR PARTNERSHIP WITH ANNISTON ARMY DEPOT FOR THE M1A2 TANK UPGRADE PROGRAM, AND WE ARE WORKING TO ESTABLISH PARTNERSHIPS FOR BOTH THE M113 AND BRADLEY FAMILIES OF VEHICLES.

NOW, WITH ALL OF THAT AS BACKGROUND, I WOULD LIKE TO GIVE YOU MY PERSONAL ASSESSMENT OF OUR ABILITY TO RESPOND TO OUR CUSTOMERS' REQUIREMENTS.

- FIRST, I CAN SAY UNEQUIVOCALLY THAT THE BASE TODAY IS POSITIONED TO SERVE OUR CUSTOMERS' CURRENTLY STATED NEEDS. IT HAS BEEN UNITED

DEFENSE'S GOAL TO BUILD A FLEXIBLE EFFICIENT BASE THAT WILL ALLOW OUR CUSTOMERS TO SPEND THEIR MONEY ON THEIR HIGHEST PRIORITY REQUIREMENTS AND NOT HAVE TO WORRY ABOUT INVESTING IN UNNEEDED ITEMS SOLELY TO SUSTAIN THE INDUSTRIAL BASE.

- HAVING SAID THE ABOVE, IT IS QUITE CLEAR TO ALL OF US IN THE DEFENSE BUSINESS, THAT THE SERVICES' MODERNIZATION BUDGETS ARE WOEFULLY INADEQUATE TO MEET THE GOALS THAT THEY HAVE SET FOR THEMSELVES TO TRANSITION TO THE 21ST CENTURY. EXAMPLES INCLUDE 2,000 FIRST GENERATION BRADLEYS REQUIRED, EVEN FOR THE SIGNIFICANTLY REDUCED ARMY, THAT ARE TECHNICALLY UNFIT FOR COMBAT. EVEN TODAY

ARMOR UNITS ARE WITHOUT RECOVERY VEHICLES THAT CAN HANDLE THE M1A1 TANK. THIS IS FOR AN ARMY THAT WILL SOON FALL TO NUMBER EIGHT IN SIZE IN THE WORLD. THE NAVY'S "FROM THE SEA" MISSION WILL GO UNSUPPORTED BY AN ADEQUATE AMPHIBIOUS ASSAULT VEHICLE FOR YEARS, AND THE LIST GOES ON. EVERY DEFENSE OFFICIAL FROM SECRETARY PERRY ON DOWN HAS STATED THAT THERE IS A "SHORT TERM" PROBLEM WITH RDA, BUT THAT SAVINGS GENERATED BY FORCE DOWNSIZING AND INFRASTRUCTURE REDUCTION, ALONG WITH ACQUISITION REFORM, WILL GENERATE SAVINGS THAT WILL BE REINVESTED IN WHAT HE CALLS "RECAPITALIZATION" OF THE FORCE. I HOPE HE'S RIGHT, BUT IT IS MY VIEW THAT WAITING FOR THIS STRATEGY TO YIELD IS A BIGGER NATIONAL SECURITY

RISK THAN WE SHOULD BE TAKING IN THE NEXT FIVE YEARS. THE READINESS OF OUR FORCE IN THE YEAR 2000 DEPENDS ON A MORE ROBUST SET OF LIFE EXTENSION PROGRAMS THAN IS NOW FUNDED--AND THE HEALTH OF THE BASE TO DEVELOP AND FIELD OUR NEXT GENERATION OF COMBAT VEHICLES WILL DEPEND ON A RELATIVELY STABLE ACQUISITION OF THINGS THAT ARE CLEARLY NEEDED IN THE INTERIM.

- FINALLY, I WOULD OBSERVE THAT WE IN INDUSTRY MUST CONTINUE TO IMPROVE OUR ABILITY TO COST EFFECTIVELY MEET OUR CUSTOMERS' NEEDS. AT THE TOP OF MY LIST OF OBLIGATIONS IS TO CONTAIN COSTS BY ADOPTING ALL OF THE MANAGEMENT AND MANUFACTURING PROCESS IMPROVEMENTS THAT CHARACTERIZE WORLD-CLASS COMMERCIAL

COMPETITORS. THE DEFENSE DEPARTMENT INITIATIVE FOR STREAMLINING THE WAY THAT WE CONDUCT OUR BUSINESS PROVIDES THE ENVIRONMENT TO MAKE MANY OF THESE IMPROVEMENTS. SECRETARY PERRY'S LEADERSHIP HAS BEEN, AND WILL CONTINUE TO BE, THE KEY INGREDIENT FOR SUCCESS. BUT CULTURAL CHANGE COMES HARD, AND WE ARE ALL GOING TO HAVE TO WORK TOGETHER TO DO WHAT MAKES GOOD BUSINESS SENSE AND IN THE PROCESS, SAVE A LOT OF MONEY.

NOW I WOULD LIKE TO BE PRESUMPTUOUS ENOUGH TO SUGGEST A FEW THINGS THAT THE COMMITTEE AND THE CONGRESS CAN DO TO HELP MAINTAIN THE READINESS AND HEALTH OF THE INDUSTRIAL SECTOR OF THE SERVICES' TRACKED COMBAT VEHICLE CAPABILITY.

CLEARLY, MAINTAINING FINANCIAL VIABILITY -- PROFITABILITY -- AS A BUSINESS VENTURE IS THE FUNDAMENTAL AND NECESSARY CONDITION TO KEEPING DESIRED DOMESTIC CAPABILITY.

WITH CAREFUL MANAGEMENT, THE CURRENT COMBAT VEHICLE BUDGET AND PROGRAM, AS I KNOW IT, SHOULD SUPPORT A VIABLE BUSINESS BASE WITH MEDIUM RISK. SOME PAST KEY PLAYERS WILL DEPART THE INDUSTRY AND THERE WILL BE DISRUPTION IN LOGISTICS. IN GENERAL, UNIT COSTS WILL RISE AS PRODUCTION RATES DROP, AND INDUSTRY MUST BE IMAGINATIVE AND INNOVATIVE TO ENSURE THAT COST DOES NOT BECOME UNACCEPTABLE.

CONSEQUENTLY, I WOULD ASK THE COMMITTEE'S HELP TO INSURE THAT FUNDING FOR TRACKED COMBAT VEHICLE PROGRAMS IS ADEQUATE TO DO A NUMBER OF THINGS. ONE, PRESERVE LONG TERM READINESS OF THE SERVICES BY SUPPORTING A REASONABLE RATE OF MODERNIZATION; TWO, TO PRESERVE THE TRACKED VEHICLE SKILL BASE NEEDED FOR CONTINUAL MODERNIZATION AND FUTURE PROGRAMS, AND, THREE, TO INSURE THAT THE PROGRAMS SUPPORT THE SERVICES' REQUIREMENTS FOR MEDIUM AND HEAVY VEHICLES.

TODAY, PROCUREMENT FUNDING IS ON THE "RAZORS EDGE". LIKE MANY OTHER AREAS OF DEFENSE, TRACKED VEHICLES COULD EFFECTIVELY USE MORE MONEY: BRADLEY AO TO A2 CONVERSIONS, MIA2 TANKS,

MORE RECOVERY VEHICLES, PALADIN HOWITZERS AND MORE BREACHERS; WE'D WELCOME THAT. WE THINK THE RELATIVE CASE FOR MORE MONEY IS COMPELLING. WE SEEK AND WOULD WELCOME YOUR SUPPORT WHEN AND IF YOU INCREASE AREAS OF THE DEFENSE PROGRAM.

AT THE POLICY LEVEL, THERE ARE SEVERAL SPECIFIC ITEMS I WOULD CALL TO YOUR ATTENTION:

FIRST, CONTINUE WITH ACQUISITION REFORM TO REDUCE NON-VALUE ADDED REQUIREMENTS FROM THE ACQUISITION PROCESS. TO THAT END, I RECOMMEND CAREFUL CONSIDERATION OF THE SECOND ACQUISITION REFORM PACKAGE PRESENTED TO CONGRESS BY THE OFFICE OF FEDERAL PROCUREMENT POLICY DIRECTOR,

STEVEN KELMAN, ON FEBRUARY 28. AS AN ASIDE, I WOULD LIKE TO COMMEND THE COMMITTEE, CONGRESS AND THE DEPARTMENT FOR THE AGGRESSIVE AND FORTHRIGHT MANNER IN WHICH LAST YEAR'S LEGISLATIVE PACKAGE WAS ACTED UPON AND IS BEING IMPLEMENTED WITHIN THE FEDERAL ACQUISITION REGULATIONS.

SECOND, I STRONGLY URGE SUPPORT OF, AND ADOPTION OF, THE DEPARTMENT'S NEW "DEPOT POLICY". I UNDERSTAND THE DEPARTMENT WILL SUBMIT A PROPOSAL THAT WILL AGAIN ENCOURAGE AND PERMIT MORE PRIVATE INDUSTRY INVOLVEMENT AND PARTNERSHIPS WITH THE DEPOTS.

THIRD, YOUR ASSISTANCE IN KEEPING OUR COMBAT VEHICLES COMPETITIVELY PRICED FOR THE EXPORT MARKETPLACE IS VERY IMPORTANT. ACTION HERE WOULD BE MOST HELPFUL; SPECIFICALLY, I URGE THAT THE REQUIREMENT FOR R&D RECOUPMENT BE DROPPED. THIS HAS BEEN PROPOSED BY THE ADMINISTRATION IN THE PAST AND IS STILL WELL SUPPORTED.

FOURTH, ATTENTION NEEDS TO BE PAID TO KEEPING THE FMS INFRASTRUCTURE COST EFFECTIVE. TEN AND TWENTY PERCENT "MARK UPS" ARE KILLERS IN TODAY'S GLOBAL MARKETPLACE.

FIFTH, WE NEED YOUR HELP TO USE THE PROCEEDS FROM FMS SALES OF INVENTORY EQUIPMENT TO FUND UPGRADES OF REMAINING EQUIPMENT. CURRENT LAW

PERMITS EASY USE OF FMS PROCEEDS TO MAINTAIN QUANTITATIVE LEVELS. IT SHOULD ALSO ALLOW THE MAINTENANCE OF QUALITATIVE SUPERIORITY. THIS COMMITTEE TOOK A LEADERSHIP ROLE HERE IN SECTION 114 OF THE FY 1993 NATIONAL DEFENSE AUTHORIZATION ACT. THAT SECTION ENABLED THE USE FOR UPGRADES, SUBJECT TO APPROPRIATION ACTION. TODAY, THERE ARE SCORING PROBLEMS THAT DISCOURAGE THE USE OF THIS AUTHORITY. INDUSTRY BELIEVES THE CONVERSION OF THESE PREVIOUS DEFENSE INVESTMENTS TO STILL BETTER DEFENSE IS A GOOD, SMART BUSINESS PRACTICE.

FINALLY, WHERE THE SERVICES ARE TRULY BENEFITED, I WOULD ENDORSE THE USE OF MULTIYEAR

PROCUREMENT FUNDING TO HELP INSURE PROGRAM AND BUSINESS STABILITY.

IF THIS COMMITTEE, UNDER YOUR LEADERSHIP MR. CHAIRMAN, COULD LOOK INTO THESE IDEAS AND ADOPT THEM, THE HEALTH AND READINESS OF THE INDUSTRY PORTION OF THE COMBAT TRACKED VEHICLE COMMUNITY WOULD BE MUCH THE BETTER FOR YOUR EFFORTS. WE ALL WOULD BE MOST APPRECIATIVE. WE SEEK YOUR HELP TO THAT END.

THANK YOU FOR ALLOWING UNITED DEFENSE AND ME, TO SPEAK FOR THE INDUSTRIAL MEMBERS OF THE TRACKED COMBAT VEHICLE INDUSTRY.

Mr. HUNTER. Mr. Rabaut, thank you.

We will now hear from Mr. Rhett Flater, executive director, the American Helicopter Society. Thank you, sir, for being with us.

STATEMENT OF RHETT FLATER, EXECUTIVE DIRECTOR, THE AMERICAN HELICOPTER SOCIETY

Mr. FLATER. Good morning, Mr. Chairman, and members of the committees. As the executive director of the American Helicopter Society, I represent the four major U.S. helicopter manufacturers. These are Bell Helicopter Textron, Inc.; Boeing Helicopters, which is a division of Boeing Defense and Space Group; McDonnell Douglas Helicopter Systems; and Sikorksy Aircraft Corp. We also represent many other members and organizations involved in the national flight arena.

Mr. Chairman, it is an honor to appear before you today to present the current state of the U.S. helicopter industrial base and its ability to meet the Nation's national security requirements. We agree that this issue is important because a robust and a competitive U.S. economic and industrial capability is required for a strong defense.

Besides Bell, Boeing, McDonnell Douglas, and Sikorsky, there are a number of additional helicopter aircraft manufacturers within the United States, but what I would like to point out, Mr. Chairman, is that these four represent more than 95 percent of the original equipment manufacturing business for military rotorcraft.

In addition, this industry requires a diversified supplier base. It ranges from turbine engine manufacturers to avionics and systems suppliers. The principal focus of the U.S. helicopter industry is defense; meeting literally the requirements and needs of the U.S. Marine Corps, the Army, the Navy, and the Air Force.

Civil and commercial markets, yes, they make up the balance, but this arena has been table in recent years and the forecasts for growth of civil and commercial markets are not adequate to offset the market and technological impact of a diminished DOD business base. So, the U.S. military is absolutely key to the viability and competitiveness of the U.S. industry.

Mr. Chairman, in our written testimony we offered a 10-year profile of the helicopter industry. This illustrates the changes in the employment levels and gross revenues of the major U.S. helicopter airframe manufacturers. I would like to make just a couple of observations about that chart that appears at the bottom of page two of the testimony.

First, the industry is declining from its 1987, 1988 peak levels, both in terms of revenues and numbers of employees. The number of employees has dropped from a peak of 37,017 in 1987 to a current level of 27,368. That is a reduction of 26 percent.

Revenues have declined almost 9 percent from a height of $5.86 billion in 1988 to the current level of $5.34 billion. This will eventually have serious implications for the state of research and development in my industry.

As you may know, IR&D is proportional to gross revenues; typically about 3 percent. So, further revenue decline will have a direct impact on the industry's investment in research and development. I think the chart prompts another observation. That is that the in-

dustry has grown more efficient. Revenues per employee have increased more than 30 percent in constant terms from $150,000 in 1989 to $195,200 in 1994.

This, of course, is attributable to the introduction of new integrated product and process technologies, advanced computing and process technologies, and improved quality control.

Another measurement of efficiency is flow time, sometimes called cycle time. This measures the period from the time an order is placed until the time of delivery. In the course of the last 6 years, we have reduced cycle time or flow time by 50 percent.

The future for the U.S. rotorcraft industry is not promising. If we look at U.S. military procurement budgets for the next 5 years, what you will see is that acquisitions of new helicopter aircraft by the U.S. military will decline significantly.

By 1997, five major production lines will close. These include the CH–47 Chinook made by Boeing; the AH–64 Apache made by McDonnell Douglas; the UH–60 Black Hawk and the SH–60 Seahawk both made by Sikorsky; and the Kiowa Warrior made by Bell.

There is only a single major new program start prior to the year 2000. The U.S. industry is on the edge of a precipice. Let's compare this to our friends abroad. Non-United States rotorcraft manufacturers are developing at least five new military or dual-use aircraft; the Franco-German Tiger, the Anglo-Italian EH–101, the multination NH–90; the Japanese OH–X; and the Russian Mi-38 transport. In addition, the Russian Government plans to begin production of the new Mi-28 in November and the Ka-50 attack helicopters.

With the elimination of the five U.S. programs which I have mentioned the remaining U.S. rotorcraft industry base is threatened. The potential loss to the United States includes thousands of high-technology manufacturing and engineering jobs.

Our forecast shows a further decline in employment between now and the year 2000 of about 25 percent. We believe the U.S. rotorcraft industry is at risk of loosing many skills critical to the Department of Defense which are needed for rotorcraft fleet sustainment and modernization.

More and more, foreign markets are important to U.S. helicopter manufacturers in maintaining production capability. Mr. Chairman, market and international political forces are threatening to reduce access by U.S. manufacturers to these markets. Several factors combine to give us this result.

First, as I have mentioned earlier in my testimony, we expect to see a decline in research and development expenditures. This directly threatens U.S. competitiveness in world markets. Foreign manufacturers, many of which are publicly funded, have become increasingly competitive and offer technology advancements on a par with the United States.

So, we would urge your support for the National Rotor Craft Technology Center, also known as National Rotorcraft Technology Center [NRTC], and similar industry and Government research and technology programs.

Second, U.S. policies are hampering foreign sales by denying the United States access to foreign markets that are open to our competitors. These include China.

Third, domestic limitations on technology transfer are prohibiting U.S. helicopters from competing in world markets with the latest technology.

Another factor which threatens the U.S. industrial base for helicopters is the planned disposition by the U.S. Army of more than 3,000 rotary-wing aircraft during the 1994, year 2000 period. We believe this raises serious safety and manufacturer liability issues, since many of these aircraft have not been designed to meet FAA air worthiness requirements.

Also, as long as we are speaking about the industrial base, continued dumping of surplus military aircraft will adversely impact that industrial base, since this has the potential for interrupting and displacing sales of new aircraft within foreign, military, and domestic civil markets.

Also, as you may be aware, private industry is prohibited by law from competing for depot level repair and maintenance. The so-called 60/40 rule directs that 60 percent of all depot level repair work, those to Government-owned facilities, without Government competitive bidding. Even though many times helicopter prime manufacturers and other industry suppliers may be the most efficient provider of depot maintenance on products of their design and manufacture.

Consequently, the American Helicopter Society would like to offer the following recommendations. First, to sustain the U.S. industry's international competitiveness, Congress should support NRTC in similar joint Government and industry research and technology development efforts.

Second, to assist U.S. helicopter manufacturers in becoming more competitive in international markets. Congress should take immediate steps to terminate geographic market limitations based on outdated foreign policy concepts.

In addition, Congress should eliminate outdated, inconsistent, and sometimes inappropriate technology transfer limitations which deny U.S. companies access to foreign markets.

Third, pending further study on safety of flight issues, an investigation of the economic impact upon the industry, the Department of Defense should suspend further disposition of surplus military rotary-wing aircraft engines and parts.

Last, Congress should restore competition for depot level maintenance and repair of helicopters by changing title X, U.S.C. 2644, which is the 60/40 rule to permit helicopter primes and other industry suppliers to bid competitively for depot level work.

Mr. Chairman, I heard the remarks of General Wilhelm a few minutes ago. I am not as attractive as he is, but I, too, was in Viet Nam during the same period of time in 1966 and in 1967. As a young marine, first lieutenant, I flew CH–46 helicopters.

I had a chance a few days ago to go through my log books. Combat is in red and noncombat is in black. As I went through there I looked at the serial numbers of the various aircraft. I made an inquiry with the Marine Corps and found that with the exception

of a few of the aircraft that were lost in Viet Nam, most of them are still flying today.

I point that out for two reasons. First of all, I point it out to demonstrate the excellence of the product of the American industry. Second, I point it out to demonstrate that it is, indeed, time to modernize the fleet.

Thank you, Mr. Chairman.

COMMITTEE ON NATIONAL SECURITY
U.S. HOUSE OF REPRESENTATIVES

Joint Hearing
The Procurement and Research and
Development Subcommittees
March 7, 1995

Testimony of M.E. Rhett Flater, Executive Director
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Good morning, Mr. Chairman. My name is Rhett Flater and I am the Executive Director of the American Helicopter Society. In this capacity, I represent the four major U.S. helicopter manufacturers -- Bell Helicopter Textron Inc.; Boeing Helicopters, a division of Boeing Defense and Space Group; McDonnell Douglas Helicopter Systems; and Sikorsky Aircraft Corporation; along with other member organizations involved in the national flight arena. It is an honor to appear before you today to present the current state of the U.S. helicopter industrial base and its ability to meet the nation's national security requirements. We agree that this issue is important since a robust and competitive U.S. economic and industrial capability is required for a strong defense.

Besides Bell, Boeing, McDonnell Douglas and Sikorsky, there are a number of additional helicopter aircraft manufacturers within the U.S., but these four represent more than 95 percent of the original equipment manufacturing business for military rotorcraft. In addition, the helicopter industry requires a diversified supplier base, ranging from turbine engine manufacturers to avionics and systems suppliers.

Importance of Military Procurement

Meeting the military requirements of the United States Army, the Navy and Marine Corps, the Air Force and Special Operations Forces Command is the principal focus of the U.S. helicopter industry. Historically, the U.S. military market accounts for approximately 80 percent of total U.S. industry revenues. Civil and commercial markets make up the balance, but this arena has been stable in recent years and forecasts for growth of civil and commercial markets are inadequate to offset the market and technological impact of a diminished DOD business base.

Hence, the U.S. military is key to the viability and competitiveness of the U.S. industry.

U.S. Helicopter Industry Profiled

I wish to offer a ten-year profile of the helicopter industry which illustrates the changes in employment levels and gross revenues (in millions, using 1994 constant dollars) of the major U.S. helicopter airframe manufacturers.

Year	Employees	Gross Revenue (1994 Dollars)	Productivity
1984	31,094	$4,820	$155,000
1985	33,323	$5,234	$157,000
1986	36,300	$5,820	$160,300
1987	37,017	$5,734	$155,000
1988	36,810	$5,861	$159,200
1989	34,865	$5,228	$150,000
1990	31,937	$5,626	$176,159
1991	31,308	$5,556	$177,500
1992	29,230	$5,179	$177,200
1993	28,423	$5,213	$183,400
1994	27,368	$5,342	$195,200

The number of employees has dropped from a peak of 37,017 in 1987 to a current level of 27,368, a reduction of 26 percent, while revenues during the same period declined seven percent from $5.86 billion to $5.34 billion.

Increased Industry Efficiency

During the past four years, the U.S. rotorcraft industry has witnessed a time of rapid change. With the application of new integrated product and process technologies, advanced computing and manufacturing technologies featuring large cost reductions, and improved quality control, the industry has become more productive and competitive. This efficiency can be measured. As shown above, revenues per employee have increased more than 30 percent in constant terms from $150,000 in 1989 to $195,200 in 1994.

Another measurement of efficiency is "flow time," which measures the period from the time an order is placed to the time of delivery. By developing more streamlined management structure, reengineering production and assembly lines, and improving inventory management systems, the U.S. helicopter industry has reduced flow times an average of more than 50 percent.

Impact of Decline in U.S. Military Procurement

U.S. military procurement of new helicopter aircraft is expected to decline significantly during the next several years. By 1997, five major production lines will close, including the CH-47 Chinook (Boeing); the AH-64 Apache (McDonnell Douglas); the UH-60 Black Hawk and the SH-60 Seahawk (Sikorsky); and the Kiowa Warrior (Bell). There is, moreover, only a single major new program start prior to the year 2000 and possibly only one additional beyond then. During this

same period, international rotorcraft competitors are developing at least five new military or dual-use helicopters -- the Franco-German Tiger, the Anglo-Italian EH-101, the multi-nation NH-90; the Japanese OH-X; and the Russian Mi-38 -- plus planned Russian production of the new Mi-28 and Ka-50 attack helicopters.

As a result, employment levels within the helicopter industry will decline by an additional 25 percent or more during the next four years. At the same time, the industry's revenues from new aircraft sales are forecast to decline significantly from current levels. This will have a further impact on the U.S. industry's international competitiveness, especially affecting investment in research and development which is proportional to revenues. Hence, IR&D at the major companies -- typically 3 percent of revenue -- will decline.

Increasing Importance of International Markets

Increasingly, foreign markets are important to U.S. helicopter manufacturers in maintaining production capability. Unfortunately, both market and international political forces threaten to reduce access by U.S. manufacturers to these markets. Several factors combine to produce this result. First, any decline in research and development expenditures threatens U.S. competitiveness in world markets. Foreign manufacturers, many of which are publicly funded, have become increasingly competitive and offer technology advancements on a par with the U.S. Second, U.S. policies hamper foreign sales by denying U.S. access to foreign markets open to our competitors, such as China. And, third, limitations on technology transfer, which at times are applied inconsistently, prohibit U.S. helicopter manufacturers from competing with the latest technology. International

competitors are supported by their governments as a matter of national policy; they do not have to address the market and technology transfer limitations that are imposed on U.S. companies.

Impact of Government Competition with the Private Sector

Another factor which threatens the U.S. industrial base for helicopters is the planned disposition by the U.S. Army of more than 3,000 rotary-wing aircraft during the 1994-2000 period. This raises serious safety and manufacturer liability issues, since the bulk of these aircraft have not been designed to meet applicable FAA airworthiness certification requirements. Also, continued dumping of surplus military helicopters will adversely impact the rotorcraft industrial base since this interrupts and displaces sales of new aircraft within foreign military and domestic civil markets.

Title 10 USC 2644, the so-called 60/40 rule, directs 60 percent of all depot level repair work to Government-owned facilities, notwithstanding the fact that the helicopter prime manufacturers and other industry suppliers are often the most efficient provider of depot maintenance on products of their design and manufacture. By eliminating this rule, helicopter primes would be permitted to compete for depot and field maintenance work. This action would also lessen the impact of dramatically shrinking procurement and R&D funding.

Why Immediate Action Is Needed

Immediate action is needed to sustain the U.S. helicopter industrial base. AHS would ask this Committee to consider the following:

• Shrinking defense budgets threaten the only major new military rotorcraft which continues U.S. military developmental programs beyond the year 2000. Sikorsky's major U.S. military programs -- the UH-60 Blackhawk, the SH-60 Seahawk, the CH-53 Sea Stallion -- have been concluded or are scheduled for termination. Similarly Boeing's CH-47 Chinook program has ended, while McDonnell Douglas's AH-64A Apache program is slated for termination in FY 1996. Bell's production of OH-58D Kiowa Warrior and AH-1W Cobra aircraft for the U.S. Army and the Marine Corps is scheduled to end. With the elimination of these and other U.S. military programs, **the remaining rotorcraft industrial base is threatened. U.S. industry can only survive by becoming more competitive in the international marketplace for commercial and military rotorcraft.**

• **Immediate action is required to avoid irretrievable losses in U.S. industry competitiveness and world market share.** The majority of foreign rotorcraft programs, whose research and development is supported by their governments, are focused on dual-use applications. These include the Anglo-Italian EH-101, the European NH-90, the Russian Mi-38, and the Japanese OH-X, among others. Not only is European rotorcraft research and technology development strongly funded by the respective governments, but it is cooperatively planned and jointly carried out by means of formal arrangements within the entire European rotorcraft community. U.S. helicopter manufacturers need to be able to compete with the combined effort of the highly organized European rotorcraft community.

• The **potential loss** to the United States includes **thousands of high-tech manufacturing and engineering jobs**. The U.S. risks losing **many skills critical to the Department of Defense** which are needed for rotorcraft fleet sustainment and modernization, such as new system development, system upgrades, and continuous improvement of already fielded systems. U.S. supremacy in rotorcraft technology, a discipline pioneered and developed by U.S. manufacturers, is threatened by the loss of market share in foreign military and civil markets.

• **Dr. Alfred Gessow,** a highly respected member of the University of Maryland's Center for Rotorcraft Excellence, **reports** in his recent study on "European Research in Rotorcraft Technologies" that **"there are a multiplicity of intra-European joint research agreements and helicopter developments that constitute a highly competitive (vis a vis the U.S.) combined capability."** He adds, "In each European country, there is a close one-on-one relationship between industry, government sponsors, research

establishments and universities that speeds technology transfer. This is less true in the U.S." Plus he notes that research programs in Europe reflect long term planning and direction with well-defined and coordinated goals, and with progressive steps taken to reach those goals. **In Japan, government and industry have organized an R&D corporation to develop advanced technologies for next generation Japanese helicopters.** The Japan Key Technology Center is providing 69.9 percent of the projects funding, while Kawasaki Heavy Industries, Shimadzu Corporation, Tokyo Avionics Instruments, Teijin Seiki Company, and Japan Aircraft Manufacturing Company will invest the balance. A total of $86.5 million will be invested over the seven-year life of the program.

Recommendations To Sustain Helicopter Industrial Base

The U.S. helicopter industry has the following recommendations:

- **To sustain the industry's international competitiveness, Congress should support the National Rotorcraft Technology Center ("NRTC") and similar research and technology development efforts.** NRTC is an industry, academia and government (Army, Navy, NASA, FAA, etc.) research and technology development partnership that focuses combined resources on the strategic objective of enhancing the competitiveness of the U.S. rotorcraft industry in world markets, while insuring the superiority of U.S. military rotorcraft. NRTC emphasizes cooperation, streamlined processes with a minimum of infrastructure, and a maximum return on investment for both industry and government. Principal NRTC thrusts will be on advancing critical dual-use competitive technologies for the needs of the industry; product and process development; reduced noise and vibration; improved reliability and safety; harmonization of military and civil standards; development of operations infrastructure; and civil all-weather, day-night capability for rotorcraft.

- **To assist U.S. helicopter manufacturers in becoming more competitive in international markets, Congress should take immediate steps to terminate geographic market limitations based on outdated foreign policy concepts.** In addition, Congress should undertake a review of current U.S. technology transfer limitations and eliminate outdated, inconsistent, and inappropriate limitations which foreclose U.S. access to foreign markets.

- **Pending further study on safety of flight issues and investigation of the economic impact upon the industry, the Department of Defense should**

suspend further disposition of surplus military rotary-wing aircraft, engines and parts.

- **Change Title 10 USC 2644 (the Depot Maintenance 60/40 rule) to restore competition for depot repair and modification by permitting helicopter primes and other industry suppliers to bid for depot level work.**

A strong defense technology and manufacturing infrastructure is needed to assure DOD cost-effective access to capabilities required across the whole spectrum of national security missions and as a component of economic security for the nation. The United States Congress, by enabling U.S. rotorcraft technology and manufacturing leadership, insures a valuable and responsive national security asset.

I thank you for affording me the opportunity to address your Committee today, and while I am able to respond to your questions, for obvious reasons I will have difficulty addressing those that relate to specific programs and companies due to the competitiveness of the member companies that I represent.

Mr. HUNTER. Thank you, Mr. Flater. We appreciate your testimony. Now, Mr. Richard Palaschak will give comment. He is the director of the Munitions Industrial Base Task Force. Mr. Palaschak, welcome. Thanks for being with us.

STATEMENT OF RICHARD G. PALASCHAK, DIRECTOR, MUNITIONS INDUSTRIAL BASE TASK FORCE

Mr. PALASCHAK. Mr. Chairman, members of the committees, thank you for the opportunity to appear before you today. As the chairman mentioned, I am here today as a director of the Munitions Industrial Base Task Force, which is a nonprofit trade association of 14 companies representing a substantial cross section of the munitions industry.

I have provided copies of my statement for the record. With your permission, I will now present an abbreviated version. As recently as 10 years ago, our country's munitions industry was a diverse, viable, and energetic production base. Its facilities were staffed with highly trained and skilled people, capable of developing and delivering the most advanced and effective munitions products in the world.

As a result of past budgetary decisions, the 286 major munitions companies which existed in 1978 are projected to shrink to just 52 companies before the end of this year; a striking 82 percent reduction.

Of even greater concern is the loss of over 60,000 skilled craftsmen from throughout the industry. The task force analysis has identified no less than 120 skills and capabilities that are essential to this industrial sector's ability to support current and future Armed Forces readiness requirements.

Let me emphasize that many of these skills are not taught in our schools and universities. They require years of intense specialized training and hands-on experience to acquire and maintain. Once lost through downsizing, layoffs, or attrition, they are difficult if not impossible to replace in any reasonably responsive timeframe.

We readily acknowledge that much of the consolidation of the base has been necessary, particularly with the end of the cold war. However, the disproportionate drop in annual munitions procurement funding during the past decade, almost 80 percent between 1985 and 1994, has placed this industry in an unnecessary crisis.

It is threatening its core abilities to provide our Armed Forces with the modern munitions they require to maintain technology dominance on the battlefield. All of this has occurred and is occurring against the backdrop of large shortages of modern preferred munitions in our Armed Forces.

Last year the Army conducted a functional area analysis of its munitions stockpile, procurement plans and industrial base capabilities. The analysis identified a $5.7 billion shortfall in Army munitions programs over the 6-year future years defense plan and recommended $3.8 billion more than was planned over this period to correct only the most serious deficiencies.

Congressional action last year which added over $300 million to the Army's budget in the fiscal year 1995 appropriation, combined with DOD planning decisions this past fall which project adding about $250 million per year to Army munitions procurement dur-

ing fiscal year 1997 through 2001 will, if carried out, address about 40 percent of the most serious issues, but only about 30 percent of the total Army need.

In April of last year, a Marine Corps witness testified before the Senate Armed Services Committee that the Corps had munitions shortages. During a recent Navy war game exercise the significance of these shortfalls to Marine Corps war fighting capabilities became apparent.

Our task force has estimated the funding shortfall to correct these deficiencies at between $1.1 to $1.7 billion or about $200 to $300 million more per year above present Marine Corps plans.

We believe the Air Force and the Navy also have such shortfalls, but truthfully we lack the hard data to estimate their scope. DOD funding projections for procurement of ammunition through 2001 are insufficient to correct the munitions readiness problems of the Armed Forces or to sustain the skills and capabilities within the munitions industrial base.

The base is becoming increasingly fragile. The financial viability of many of the survivors is marginal. Modernization of plant and equipment is virtually halted. Dual use or conversion remedies for sustaining the munitions industrial base are not viable solutions for an industry with virtually zero commercial markets.

As plants cease production of entire product lines and go cold, the bases ability to respond rapidly to service needs evaporates. The time required to replenish expenditures following a major regional conflict stretches to unacceptably long periods.

Unfortunately, some lines are going cold before the service requirements have been satisfied. We are then placed in a situation wherein our service men and women are short of modern preferred munitions for just one major regional conflict. The surviving industry will be unable to remedy the shortfalls in time to minimize casualties.

In addition to these findings and perhaps most important to supporting our Nation's current and future strategic goals is the ability of industry to maintain a strong research and development base to incorporate product improvements into existing munitions.

At this time, Government funding for research and development programs has been reduced, but is permitting most efforts to continue. However, because of the overall munitions budget cutbacks, the key ability of industry to take the initiative and self-fund independent research and development has been seriously curtailed.

All of the points I have made today demonstrate a significant mismatch between the demands of our Nation's military planning objectives, the munitions shortages of our Armed Forces, and the capabilities of the munitions industrial base. Without a munitions industrial base, we are not ready for war, cannot sustain war, and most important we may not be able to avoid war. Our message today is that the munitions industrial base is in serious trouble. Much of the problem can be fixed by modest increases in procurement of needed, modern preferred munitions; the kind that will save many American lives when we send our Armed Forces into the next war.

The task force is working now on specific recommendations which both meet the minimal needs of the industrial base and

which will also rectify readiness shortfalls in our Armed Forces. I would be pleased to provide our recommendations to the committees when completed in about 2 weeks.

Also, Mr. Chairman, the task force has prepared a short video which provides a graphic summary of the points I have covered here. If you desire, I can provide copies to the committees for your use.

One final thought; the only reason for having a weapons system is to use it to deliver munitions against a target. Thank you for your attention.

STATEMENT OF

MR. RICHARD G. PALASCHAK

DIRECTOR OF OPERATIONS
MUNITIONS INDUSTRIAL BASE TASK FORCE

Mr. Chairman, members of the Committee, thank you for the opportunity to appear before you. I am here as the Director of the Munitions Industrial Base Task Force, a non-profit trade association of 14 companies representing a substantial cross section of the munitions industry. This task force was formed to pursue a common – and what we believe to be a valid national strategic goal: to advocate the adequate funding and policies required to sustain a responsive, efficient U.S. munitions industrial base, an industrial base with the minimum but necessary capabilities to continue developing, producing and providing superior munitions for the U.S. and its allies. Today, I will present the collective view of these companies regarding the condition of our industry, the implications of munitions funding decisions on the readiness of our nation's armed forces, and provide some data which may suggest to the Committee those actions required to reverse current trends and, thereby,:

- Remedy the growing munitions shortfalls in the inventory and;

- Halt the deterioration of our sector's capabilities.

Numerous studies by government and independent organizations, as well as extensive studies by the MIBTF itself, all point to a crisis in the munitions industrial base. It was not caused by a lack of munitions requirements, but by deliberate decisions to place available funds against other service programs. Sadly, in times of relative peace, munitions programs have always been a stepchild in service and DOD budget debates.

As recently as 10 years ago, our country's munitions industry represented a diverse, viable and energetic production base. Its facilities were staffed with highly trained and skilled people capable of developing and delivering the most advanced and effective munitions products in the world. But as a result of past budgetary decisions, the robust munitions industrial base of 286 companies

which existed in 1978 had dwindled to about 88 firms in 1994. This base, as projected by the Army's Ammunitions Base Manager, will have just 52 companies by the end of this year; an 82% reduction in just 17 years. At the same time the government production base has shrunk by over 40% from 32 to 19 facilities. Only nine of these remaining nineteen plants will be actively workloaded with production. Of even greater concern is the loss of over 60,000 skilled craftsmen throughout the industry. The MIBTF analyses have identified no less than 120 skills and capabilities that are essential to the munitions industrial base's ability to support current and future armed forces readiness requirements. These skills include such exotic talents as explosives engineering and design; warhead liner development; fuze design and production; incendiary design and production; unique metal parts fabrication and plating – just to name a few.

Let me emphasize that many of these skills are not taught in our universities. They require years of intense, specialized training and "hands-on" experience to acquire and maintain. Once lost through downsizing, layoffs or attrition, they are difficult, if not impossible, to replace in any reasonably responsive time frame.

We readily acknowledge that much of this consolidation of the base has been necessary, particularly with the end of the cold war. However, the disproportionate drop in annual munitions procurement funding during the past decade – almost 80% between 1985 and 1994 – has placed this industry in an unnecessary crisis, and is threatening its core abilities to provide our armed forces with the modern munitions they require to maintain technology dominance on the battlefield. All of this has occurred, and is occurring, against a backdrop of large shortages of modern munitions in our armed forces.

The FY95 Defense Appropriations Bill recognized this problem and, in a bipartisan Congressional effort, added almost $400 million to the munitions procurement accounts. This additional funding provides one more year for the nation's leaders to address and resolve the freefall decline in the munitions industry. The accompanying Report stated the expectation that the DOD would submit a budget in 1996 and future years at least at the same level as the adjusted FY95 Appropriation of $1.95B. Unfortunately, the FY96 budget for all

DOD munitions totals $1.5B, which is $80M less than the FY95 budget and $444M less than the Congress appropriated last year. Outyear projections, which had been even lower than the FY96 budget, have been improved by DOD action such that they also now total about $1.5B each year. Unfortunately, this level of funding is not enough to correct the munitions shortages in the armed forces nor can it sustain the critical skills and capabilities of the munitions industrial base.

Last year the Army conducted a Functional Area Analysis of its munitions stockpile, procurement plans, and industrial base capabilities. The analysis identified a $5.7B shortfall in Army munitions programs over the FYDP and recommended a program of $3.8B over this period to correct the most serious deficiencies. Congressional action which added $336M to the Army's budget in the FY95 Appropriation, combined with DOD planning decisions which project adding about $250M per year to Army munitions procurement during FY97 through 2001 will, if carried out, address about 40% of the most serious issues, but only about 30% of the total need.

In April of last year, a Marine Corps witness testified before the SASC that the Corps had munitions shortages. During a Navy war game exercise in January of this year, the significance of these shortfalls to Marine Corps warfighting capabilities became apparent. Our Task Force has estimated the funding shortfall to correct these deficiencies at between $1.1 to $1.7B over the next six years, about $200-300M per year above present Marine Corps plans. We believe the Air Force and Navy also have shortfalls but truthfully we lack the hard data to estimate their scope.

Against these shortages let me put a few other pertinent facts before you. I shall focus on the Army as an example because they have the largest requirements.

- Less than 15% of the Army's stockpile is preferred munitions, the modern munitions required to maintain technology dominance on the battlefield. Consider also that the tonnage of preferred munitions currently in the Army stockpile is less than the tonnage of munitions sent to Saudi Arabia for Desert Storm.

- Second, in December 1993 the Army told Congress that 36% of all war reserves, including preferred, were unusable for combat. We assume that a similar situation continues to exist today.

- Third, 40-60% of the Army's annual training ammunition needs continue to be taken from war reserves, further exacerbating the problem.

I have provided data on the Army, because they have done the best job we've seen of analyzing, documenting, and trying to correct their problems. Unfortunately, these corrective actions have fallen short for lack of funding in the Army's FY1996 Budget and Future Years Defense Plan.

As stated, DOD funding projections for procurement of ammunition through 2001 are insufficient to: (1) correct the readiness problems of the armed forces or (2) sustain the skills and capabilities within the munitions industrial base. The base is becoming increasingly fragile, the financial viability of many of the survivors is marginal, and modernization of plant and equipment has virtually halted. The uniqueness of the skills and capabilities in the munitions base has been well documented by numerous organizations including the DOD itself. These same studies have concluded that dual use or conversion remedies for sustaining the munitions industrial base are not viable solutions for an industry with virtually zero commercial markets.

As plants cease production of entire product lines and go cold, the base's ability to respond rapidly to service needs evaporates and the time required to replenish expenditures following a Major Regional Conflict stretches to unacceptably long periods. Unfortunately, some lines are going cold before service requirements have been satisfied. We are then placed in a situation wherein our servicemen and women are short of modern preferred munitions for just one Major Regional Conflict and the surviving industry will be unable to remedy the shortfalls in time to minimize casualties.

In addition to these findings – and perhaps most important to supporting our nation's current and future strategic goals, is the ability of industry to maintain a strong research and development base to incorporate product improvements through emerging technologies. Historically, both our Government and the

munitions industry dedicated substantial research to continuous improvement of existing munitions. At this time, government funding for R&D programs has been reduced – but is permitting most efforts to continue.

However, because of the overall munitions budget cutbacks, the key ability of industry to take the initiative and self-fund independent research and development has been seriously curtailed.

Army estimates indicate that as much as 80% of the product improvements in munitions originated from industry funded R&D. Industry generates the funds needed to conduct independent research and development from company profits – profits derived primarily from defense production contracts. Unfortunately, the ten year free-fall in munitions procurement funding has not only endangered this nation's production capabilities, but it has also seriously damaged industry's ability to continue underwriting these independent research efforts.

As it stands now, unless munitions procurement budgets increase, this independent source of research will continue to wither and eventually cease.

All of the points I've made today demonstrate a significant mismatch between the demands of our nation's military planning objectives, the munitions shortages in our armed forces, and the capabilities of the munitions industrial base. The hard reality is that without factories and skilled workers there is no industrial base. And without a munitions industrial base, we are not ready for war, cannot sustain war, and most importantly may not be able to avoid war.

Our message is that the munitions industrial base is in serious trouble but much of the problem can be fixed by modest increases in procurement of needed, modern, preferred munitions, the kind that will save many American lives when we send our armed forces into the next war. The Task Force is working now on specific recommendations which meet the minimal needs of the industrial base and which also rectify readiness shortfalls in our armed forces. I would be pleased to provide our recommendations to the Committee when completed in about two weeks.

Mr. Chairman, the MIBTF has prepared a short video which provides a graphic summary of the points I have covered here. If you desire, I can provide copies to the Committee for your use.

One final thought – the only reason for having a weapons system is to use it to deliver munitions against a target.

Thank you for your attention.

* * * * *

Mr. HUNTER. Mr. Palaschak, thank you for your provocative and somewhat shocking statement. We appreciate your candor with respect to the situation.

Our cleanup witness here on the industrial base panel from the civilian sector is Mr. David Hardison. He is chairman of the Army Science Board Study, entitled "Preservation of Small Arms Industrial Base." Mr. Hardison, welcome and thank you for being with us.

STATEMENT OF DAVID C. HARDISON, CHAIRMAN, ARMY SCIENCE BOARD STUDY, ENTITLED "PRESERVATION OF SMALL ARMS INDUSTRIAL BASE"

Mr. HARDISON. Thank you, Mr. Chairman and distinguished members. I am David Hardison. I am here as the person who chairs the Army Science Board study on a plan to preserve the critical elements of the small arms industrial base.

That plan responded to language contained in the fiscal year 1994 report of the Senate Armed Services Committee. My statement this morning reprises the panel's work. It does not represent an official position of the Army.

The panel was comprised of five members and one consultant of the Army Science Board and one consultant from the Defense Science Board. Names, affiliation, and selected experience of these persons is attached in the statement that has been provided. The panel's mission was to develop a plan to preserve the critical elements of the small arms industrial base.

Four specific tasks were assigned.

One, define the critical elements of the small arms industrial base.

Two, identify opportunities for insertion of technology into small arms.

Three, develop a cost effective plan for minimizing peacetime operating costs while retaining technical and engineering expertise, preserving production and surge capacity and spreading future procurement fairly.

Finally, estimate the costs of the plan. You will note that the panel was not asked to assess whether the funds that would be required to preserve the small arms industrial base would be better spent on other things.

This question was understood, but it was outside of the panel's terms of reference. During the month of the last month of calendar year 1993, the panel received numerous briefings and responses to requests for data from war fighters, logisticians, Army acquisition personnel and representatives of the principal industrial firms involved in small arms production.

Members visited five small arms factories for examination of facilities, equipment, and production processes. In early January 1994 the panel completed its report. Its report, with Army comments, was forwarded to the Senate in March 1994. Thus, my remarks should be taken as the situation when the panel completed its work over a year ago.

Let me begin by a few facts regarding military small arms and the small arms industrial base. Currently, U.S. military forces have at least 14 types of small arms. Stocks on hand, all types

combined, exceed 2.3 million. For four types of small arms, stocks in-hand are below stated requirements. These are the M249 swat assault weapon, the M4 carbine and the M16A2 rifle and the M19 grenade machine gun.

Total inventory value of stocks on hand is estimated to be about $2.3 billion. Research and development of small arms in recent years has been done chiefly by industry. Some 50 firms have been involved from time to time. Small arms have been produced chiefly by eight firms. Five of these firms are mainly producers of commercial arms, for example, shotguns; limited quantities of which have been procured for military use.

The other three firms, SACO Defense, FNMI and Colt's Manufacturing comprise the bulk of the U.S. military's small arms production base. The cost of equipment in these small arms factories range from about $30 million to over $70 million. Of the 40 percent of that, 40 percent of the equipment is owned by the Government.

Repair parts have been procured mainly as small business set asides. Annual costs have been averaging about $15 million a year. Overall, it has been done cheaply at Anniston Army Depot. Annual cost has averaged about $10 million a year.

Over the 5-year period, 1990 to 1994, the total yearly expenditure has averaged about $120 million per year. The funds requested for fiscal year 1995 and planned for the immediate following years are very much below the recent historical level. Arms production stops.

Now, to our findings. The elements of the small arms industrial base whose preservation is critical if delays of something like 18 to 36 months in any future production of small arms are to be avoided were determined to be the following: one, qualified personnel having experience-based knowledge and expertise in operating small arms production lines.

Some of the skills involved are not quickly learned. They are not well stored on paper and they are not used elsewhere.

Two, certain specialized equipment, tooling, and processes to include deep hole drills, robotics welding, rotary forges, and plating apparatuses.

Finally, technical data packages and production rights for arms that might have to be produced again. The arms or principal interest as regards preservation of production capabilities are the 556 millimeter M249 swat assault weapon, the 40 millimeter MK19 grenade machine gun and to a lesser degree the 5.56 M4 tarbine and the 5.56 millimeter M16 rifle.

The technologies best suited to improve the performance of existing small arms are add-on optical sights, modular fire control for crew served weapons and light weight mounts made of composite materials.

The technologies offering the most promise for enabling advanced small arms in the future are electro-optical sights, digital fire controls, and weapons and fuze setting mechanisms compatible with precision-bursting munitions. These would all have to be miniaturized for use as a small arms applique.

To the suggested plan. A total of 13 options for preserving the industrial base were formulated, costed and assessed in terms of the extent to which they met specified objectives.

The principle cost driving differences amongst the options for preserving the small arms industrial base were the number of industrial firms to be sustained, the procurement source of repair parts and the element of the base that would perform overall of unserviceable arms.

It turned out that the least costly way to retain production and surge capabilities, to retain technical and engineering expertise and to spread future procurement fairly would have the Army do the following:

One, provide the bulk of its small arms research and development funds to industry. That continues its recent practice.

Two, downsize the Army supported production industrial base to two competitively selected firms.

Three, cause reconfiguration of the two selected production industrial base firms from their current mode of "build-to-print" large-scale production operations to more diversified "systems houses" operating at smaller scale.

Four, provide stable, multiyear funding amounting to something on the order of $25 to $30 million per year to each of the two competitively selected firms for work that would result in preservation of the base.

The winning industrial firms would perform six types of work. One, produce repair parts.

Two, produce modification parts to improve currently fielded arms.

Three, overhaul unserviceable arms returned from field use.

Four, preserve surge production facilities and equipment.

Five, produce modest quantities of arms now available and less than the required numbers. I already told you what they were.

Finally, as appropriate, proof of the Technical Data Packages by limited production of certain arms that have not previously been produced by the firm selected for the base.

That is to say, there is no way you can select two firms that will have produced all of the arms. That you will want to save the capability to produce in the future if necessary.

I want to repeat the point I made before. The least costly way to preserve a viable small arms industrial base would be to concentrate arms production, repair parts production, and arms overhaul in the firms selected to preserve the base. Therefore, the plan included changes in the source of procurement of repair parts and the performance of arms overhaul.

Turning to costs. The average annual cost of the proposed plan would be about $79 million. Of the $79 million per year, work amount to a minimum of $53 million would be done by the two firms selected to preserve the production base.

The plan does not include funds for full development or production of new arms. Should such efforts be undertaken, those costs would be additive to the figures I quoted. If changes in the repair parts procurement and overhaul practices are not to be accommodated, then one might elect to support only a single industrial base preservation firm. Compared to the panel's plan, that option would preserve less production capability, preserve less technical and engineering expertise, offer no opportunity for competition and would

not be less costly. In the judgment of the panel, it is less attractive than the one we suggested.

If the total annual funds are cut below $62 million a year, then small arms, product improvement and support will have to be reduced below the historical levels of keeping the existing stocks in reasonable shape. More than that, production probably would be nil.

Of course, at this funding, that is the level below $62 million a year, critical elements of the small arms production base simply will not be preserved. Details supporting this brief summary are contained in the panel's report that has been previously provided to the Congress.

That completes my statement, sir.

STATEMENT OF DAVID C. HARDISON
to
COMMITTEE ON NATIONAL SECURITY
U.S. HOUSE OF REPRESENTATIVES

MARCH 7, 1995

Mr. Chairman:

My name is David Hardison. I was the Chairman of a Panel of the Army Science Board that prepared a plan to preserve critical elements of the small arms industrial base. That plan was prepared in response to language contained in the FY 1994 report of the SASC.[1] I have been asked to reprise the effort. My testimony today describes the findings of the panel and does not represent the official position of the Army or the Department of Defense.

PANEL MEMBERSHIP.

The Panel was comprised of five members and one consultant of the Army Science Board and one consultant from the Defense Science Board. Names, affiliation, and selected relevant experience are attached hereto.

MISSION.

The Panel's mission was to develop a plan to preserve the critical elements of the small arms industrial base. Four tasks were assigned:

- Define the critical elements of the small arms industrial base.
- Identify opportunities for technology insertion into small arms.
- Develop a cost-effective plan that minimizes peacetime operating costs while retaining technical and engineering expertise, preserving production and surge capacity, and spreading future procurement fairly.
- Estimate the costs of the plan.

Senate Armed Services Committee (SASC) Report 103-112, National Defense Authorization Act for Fiscal Year 1994, dated July 27, 1993

Note that the Panel was not asked to assess whether the funds that would be required to preserve the small arms industrial base would be better spent on other things. The importance of this question was understood, but it was outside the Panel's Terms of Reference.

ACTIONS.

During the late months of CY 1993, the Panel received dozens of briefings and responses to requests for data from warfighters, logisticians, army acquisition personnel, and representatives of the principal industrial firms involved in small arms production. Members visited five small arms factories for examination of facilities, equipment and production processes. In early January, 1994, the Panel completed its work and submitted its report to the Army. That report, with Army comments, was forwarded to the Senate on March 17, 1994. The remarks that follow are to be taken as being the situation at the time the Panel's work was completed, i.e. January, 1994.

SECTOR DESCRIPTION.

First, a few facts regarding military small arms and the small arms industrial base:

- Currently, US forces have at least fourteen types of small arms.
- Stocks on hand, all types combined, exceed 2.3 million; for selected items, stocks are below stated requirements.
- Inventory value is estimated to be about $2.3 B.
- R&D of small arms is done chiefly by industry; some fifty (50) firms have from time-to-time been involved.
- Small arms have been produced chiefly by eight firms. Five of these firms are mainly producers of commercial arms (for example, shotguns) limited quantities of which have been purchased for military use. The other three firms (e.g. SACO Defense, FNMI, and Colt's Manufacturing) produce only military arms or a mix of military and civilian items. These three major producers comprise most of the US military small arms production industrial base.
- The cost of the equipment in the small arms factories ranges from about $30M to over $70M, over 40% of it is government owned.

■ Repair parts have been procured mainly as small business set asides.

■ Overhaul has been done chiefly at Anniston Army Depot.

■ Over the five year period 1990-1994, the total yearly expenditures for R&D, procurement, and support of small arms averaged about $121M per year.

■ The funds requested for FY95 and planned for the immediately following years are well below that level, especially in the procurement accounts.

SPECIFIC FINDINGS.

The elements of the small arms industrial base whose preservation is critical if long delays in any future production of small arms are to be avoided were determined to be--

■ Qualified personnel having experience-based knowledge and expertise in operating arms production lines; some of the skills involved are not quickly learned, well-stored on paper, or used elsewhere.

■ Certain specialized equipment, tooling, and processes to include deep hole drills, robotic welding, rotary forges, and plating apparatuses.

■ Technical Data Packages, to include manufacturing process information, and Production Rights for current arms that may need to be produced again in the future

The arms of principal interest as regards preservation of production capabilities are the M249 SAW, the MK19 grenade machine gun and, to a lesser degree, the M4 carbine and the M16A2 rifle

The technologies best suited to improve the performance of current small arms are optical sights, modular fire control for crew served weapons, light weight mounts made of composite materials, and selected re-designed failure-resistant components. The technologies offering the most promise for enabling advanced small arms in the future are electro-optical sights, digital fire controls, and weapons and fuze setting mechanisms compatible with precision-bursting munitions.

SUGGESTED PLAN.

A total of thirteen options for preserving the industrial base were formulated, costed, and assessed in terms of the extent to which they met specified objectives and other desires. The principal cost-driving differences among the options for preserving the small arms industrial base were the number of industrial firms to be sustained, the procurement source of repair parts, and the element of the base that would perform overhaul of unserviceable arms.

The least-cost way to retain production and surge capabilities, retain technical and engineering expertise, and spread future procurement fairly would be to have the Army --

■ Provide the bulk of its small arms R&D funds to industry. This would continue current practice.

■ Down-size the Army-supported production industrial base to two competitively selected firms.

■ By allocation of work, cause reconfiguration of the two selected production industrial base firms from their current mode of "build-to-print" large-scale production operations to more diversified "systems houses" operating at smaller scale.

■ Provide stable, multi-year, funding amounting to about $25M-$30M to each of the two competitively selected industrial firms for work that would result in preservation of the industrial base. The work to be done by the winning industrial base preservation firms would consist of--

■■ Production of repair parts.

■■ Production of modification parts to improve currently fielded arms.

■■ Overhaul of unserviceable arms returned from field use.

■■ Preservation of surge production facilities.

■■ Production of modest quantities of selected arms. (The arms now available in numbers below the Army Acquisition Objective and hence in this category are the M4 carbine, M249 SAW, MK19 grenade machine gun, and M16A2 rifle)

■■ As appropriate, proof of TDPs by production of limited quantities of selected arms not previously produced by the firms selected to preserve the industrial base.

Note that production of small arms repair parts heretofore has been mostly small business set aside, and that small arms overhaul work heretofore has been done at Anniston Army Depot.The least costly way to preserve a viable small arms industrial base would be to concentrate both production and support work in the firms selected to preserve the small arms production industrial base. Therefore the plan includes significant changes in the source of repair parts and performance of arms overhaul.

COSTS.

The average annual cost of the proposed plan would be about $79M. Of that amount, $15M would be for tech base and product improvement R&D efforts; $15M would be for production of product improvement items for current arms; $15M would be for production of repair parts; $10M would be for overhaul of arms; $4M would be for program management; and, the remaining $20M would be spent on other base preservation actions of which $18M per year, on average, would be for production of arms now available in quantities below the Army Acquisition Objective.

Of the $79M per year, work amounting to a minimum of $53M per year would be done by the two firms selected to preserve the production industrial base.

The plan does not include funds for full development or production of new arms; should such efforts be undertaken, the costs would be nearly additive.

Execution of the Panel's Plan would require the addition of a minimum of $27M per year, on average, to the funds currently in the Army's program and, as previously stated, changes in the Army's traditional approach to procurement of repair parts and overhaul of unserviceable weapons.

If changes in repair parts procurement and overhaul practices are not to be accommodated, then one might elect to support only a single industrial base preservation firm. Compared to the Panel's Plan, this option would preserve less production capability, preserve less technical and engineering expertise, offer no opportunities for competition, and would not be less costly. It was,

therefore, judged to be overall less attractive than the suggested Plan provided that changes in repair parts procurement and overhaul are accepted.

If funds at the $79M per year level are not to be available, then lower cost options must be considered. Assuming that the level of R&D, product improvements, and demand-driven arms support used in the Plan are to be maintained, and that small arms production is totally shut down, then funds in the amount of about $62M per year would be needed. In this case, the specified objectives of preserving the critical elements of the small arms industrial base simply would not be met.

At annual funding below the $62M level, small arms R&D, and/or product improvements, and/or support would have to be reduced below the levels contemplated in the Plan and production would be nil. Of course, at this funding level, critical elements of the small arms production industrial base simply would not be preserved.

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PANEL MEMBERSHIP

Dr. Richard Haley. Private Consultant.

Experience: Deputy for Science and Technology, USArmy Materiel Command. Deputy Director of Developments, USArmy Material Command. Program Manager, Nimbus Satellite. Twenty one years of civilian service with NASA and Department of Army. Twenty one years of active duty officer in USArmy and USAir Force.

Mr. David Hardison -- Chairman. Private Consultant.

Experience: Director, USArmy Concepts Analysis Agency. Deputy Under Secretary of Defense (Tactical Warfare Programs). Deputy Under Secretary of the Army (Operations Research). Science Advisor, US Army Combat Development Command. Thirty two years with Department of Army and Department of Defense working in ballistics, armament systems, operations analysis, combat developments, and materiel acquisition.

Mr. James Jacobs (Deceased). Director, Facilities, Sandia National Laboratories.

Experience: Chairman, Army Science Board. Staff, Sandia National Laboratories. High Tech Security Systems. Nuclear Weapons. Aerospace Safety. Space Power. Artificial Intelligence/Robotics. Systems Analyst, Apollo Space Program.

Mr Milton Margolis. Research Scientist, Logistic Management Institute.

Experience: Director, Cost Analysis Improvement Group of the Office, Secretary of Defense.

Mr. Gordon Sigman, Jr. V. P. Planning and International, United Technologies Corporation.

Experience Work in ordnance design, development and production. Fire control systems, Optical/Electro Optical Systems, Lasers, Adaptive Optics.

LTG (USArmy Rtd) Lawrence Skibbie. President, American Defense Preparedness Association

Experience Deputy Commander, Research, Development, and Acquisition, USArmy Materiel Command Deputy Commander for Readiness, USArmy Materiel Command. Commanding General, Army Comm. and Electronics Command. Appropriations Director, Department Of Army Staff. Commander, Rock Island Arsenal. Commanded Maintenance Battalion in combat in Vietnam. Associate Professor of Ordnance, West Point

Dr. Robert Weigle Director, Physical Sciences Lab, New Mexico State University.

Experience: Director, USArmy Research Office. Technical Director, USArmy Armament Research and Development Command. Chief Scientist, USArmy Watervliet Arsenal. Research Scientist, Rensselaer Polytechnic Institute.

Mr. HUNTER. Mr. Hardison, thank you very much for your statement. Gentlemen, we are going to go to questions. I would ask you to execute another complicated maneuver.

I want you to stay at the table, gentlemen from industry, and I want the service witnesses to join you at the table.

While we are here, also I want to thank the chairman of the full committee for sitting in with us, Mr. Spence, and acknowledge his presence. Mr. Dellums, our ranking member was here until just a minute ago and will be back soon.

We obviously have a full plate of witnesses. We have a lot of members who want to ask questions. I want to ask my colleagues, as someone who has regularly violated the 5-minute rule, I want to request that my colleagues initially confine their questions to programs that the industry representatives can address.

If we have some time for additional questions, we are going to ask the service witnesses to respond afterwards, if we are talking about systems that have not been addressed here. We will also try to stay within the 5-minute rule.

Try to time your questions so that you can comfortably ask the question and the witness can comfortably answer the question. Let me start off, gentlemen from the service, by posing this question.

Most of us are familiar with the recent study that was commissioned by Senator McCain in which he asked four former four-star officers, Gen. Charlie Gabriel, former Air Force Chief of Staff, Gen. Al Gray, former Marine Corps Commandant, Adm. Carlyle Trost, former Navy CNO, and Gen. Robert Riscossi who was former CINC of the U.N. Command in Korea, to evaluate our posture, the President's budget, and where the industrial base is going. He asked them basically to give their own evaluation of the Bottom-Up Review.

Let me quote what I think was a very salient section of their report and ask you to comment on it. "Let us not mince words. Each generation owes the next a duty to invest in their future, to ensure they will have the equipment necessary to meet the challenges that will surely confront them.

"Today, we are failing utterly to make that investment. Our legacy to the next generation is likely to be 45-year-old training aircraft, 35-year-old bombers and air lifters, 25-year-old fighters, 35-year-old trucks and 40-year-old medium-lift helicopters.

"If care is not taken to ensure midterm readiness through modernization and long-term readiness through investment in research and development, we will eventually find ourselves facing an insurmountable bill to replace entire inventories of aging equipment with an industrial base unprepared for the task."

Gentlemen, I would like each of our military witnesses to state for the record whether or not he agrees with these retired officers.

If you agree, please tell us your prescription for solving this problem. If you do not agree, please tell us why not.

General Loh, let me tell you General Campbell did an excellent job of standing in for you with opening statement. Thank you for being with us. We will let you lead off.

General LOH. Mr. Chairman, thank you very much. First, let me apologize for showing up late this morning. There was an awful lot

of fog in the First District of Virginia this morning. I thank General Campbell for reading my opening statement.

In response to your question, I agree with parts of the quotation that you made. Let me try and phrase it in a slightly different way. I believe that the three elements of our budget, that allocated to readiness and sustainability, that allocated to force structure, and that allocated to modernization should be considered more coequal than they are these days.

I think that gets at one of the points that Senator McCain's study was looking at. In my case, as commander of Air Combat Command responsible for providing all of the land-based Air Force assets around the world, we are in pretty good shape with regard to readiness these days; not in the best of shape, but in pretty good shape I think relative to other force elements within the military.

However, with regard to force structure and modernization, we are kind of almost on the edge. With regard to force structure, we are pretty hard pressed right now to be able to handle the two MRC scenarios that would require us to win quickly and decisively with overwhelming force.

In two nearly simultaneous MRC's, one of the limitations of that is adequate force structure; particularly in the case of numbers of upgraded bombers and in the case of adequate numbers of fighters with Stealth and precision weapons capability to the extent that we would have to swing some of those assets from one MRC to another in order to compensate for the drawdown in the force structure.

Finally, with regard to modernization, I believe strongly that we need to stay the course with a strong science and technology program and with a strong investment in the systems that I look to for the future. That is the F–22 program and the Joint Advanced Strike Technology program that will produce a whole generation of future fighters for all of the services are from those two programs. So, we need to stay the course with those programs because that is the future in terms of our modernization.

Mr. HUNTER. General Hartzog.

General HARTZOG. Thank you, Mr. Chairman. I think the notion of balance is a good one. I would use the term "equilibrium" between the present and future. I think in our case, because we are a decisive land force and do not intend to fight within the confines of our country, strategic mobility is an enabling factor for us.

I would say that the C–17 and sealift investments of both of my comrades here are very important. In the near term, we have chosen to maintain the readiness as a centerpiece, limit the number of new starts of equipment and to preserve the key systems that we think are key investments for the future that I described in my opening statement. One in which information and digitalization is critically important.

I would also say that we are putting a great deal of effort and investment into a plan to get us to that future in a defined way. There is a price to be paid. The price that we have paid at this point is essentially in combat support and combat service support and in things that are not necessarily as visible or perhaps front-page news such as ammunition and tactical mobility, trucks and things of that sort.

We need some near-term support in making sure that we can support the current force and the near-term force. I think we do have a good plan to state what we believe the future might be and to get us to it.

Mr. HUNTER. Thank you, General Hartzog. Admiral Lopez, let me ask my remaining two witnesses to respond to the statement that I cited to you in the McCain report.

Let me just finish the last statement of that. "If care is not taken to ensure mid-term readiness through modernization and long-term readiness through investment in research and development, we will eventually find ourselves facing an insurmountable bill to replace entire inventories of aging equipment with an industrial base unprepared for the task."

That is the question I want you to respond to. Tell me if you agree or if you do not agree.

Admiral LOPEZ. I agree that if we do not invest in the future we will not have a Navy. We think we have a good solid plan for particularly during the FyDP-up, as I briefed this committee last year, the Navy has taken certain risks by taking down its force structure, a heavy investment in BRAC.

There are some other savings that we hope to capitalize on which are regional maintenance and outsourcing. All of those things have to work in order for us to have a modern force in the future. We expect to save by the end of the FyDP-up upwards of $3.5 billion a year by the actions that we have taken.

We think we have a good investment in our research and development. We are building airplanes. We are building ships. We are building submarines. We think readiness is OK for today. It is something you have to watch all of the time. Readiness is perishable.

The last thing I might add is that we have calculated that the TOA must not come down. Otherwise, we will not be able to recapitalize our future. In summary, as I look at the plan across the fit-up, I am satisfied that the Navy and the Marine Corps, our support of them, their support of us can meet our commitments. We can stay engaged forward. I think we can prevent crisis and ultimately prevent war.

Mr. HUNTER. Thank you, Admiral. General Wilhelm.

General WILHELM. Yes, sir. You may recall that in my opening statement I mentioned that as directed we had accorded first priority to the funding of our readiness accounts and to attending to some long-overdue-selective quality of life needs of the force.

That was done at the expense of our modernization account. I mentioned that both our procurement and our modernization accounts are severely underfunded. I agree wholeheartedly with the assessment provided by our former military commanders.

In some cases, the Marine Corps may be a good test case for this because we are a little bit smaller and maybe we are a little bit easier to look at. Mr. Hunter, I am going to respond directly to your statement about mortgaging the future in the interest of the present.

We refer to the state of the Corps in terms of its health and wellness. Its health is its ability, its vitality, its robustness to do today's missions. Its wellness is the ability to develop itself and

grow into future missions and to provide the same kinds of capabilities after the turn of the century that we provide now.

Our procurement account does not paint a very rosy picture. For about the last 30 years, we average somewhere between about $1.2 billion and $1.4 billion on average in the procurement account.

In fiscal year 1996, we had $474 million. By conservative estimate, we think that to maintain a minimum level of modernization, it will take us about $1 billion a year and that is only on the ground side of the Marine Corps.

To adequately meet our medical and our aviation and our research and development needs which are funded out of Navy appropriations, that figure would grow to more like $3 billion a year. We will not approximate $1 billion in procurement funding until around the year 2001.

I think that defines where we are. We already talked about the age of combat systems. Our primary medium lift asset made its appearance in 1966. Our primary mechanized vehicle which provides us both our ship-to-shore mobility capability and provides us cross-country mobility with our main battle tank appeared in 1971.

Both the M–198 which is our dual purpose general support and direct support howitzer first appeared in 1980 and has aged quickly. It is in need of replacement, along with our entire medium tactical vehicle fleet. So, I think you can see that at least from the course perspective a robust investment in modernization is imperative.

Mr. HUNTER. Thank you, General. Gentlemen, thank you for answering that question. Mr. Weldon.

Mr. WELDON. Thank you, Mr. Chairman. I understand a lot of members want to ask questions so I will be as brief as I can.

First of all, I want to set the tone for this hearing, our first joint Procurement and Research hearing, with the chart to our left and to my right, which from an historical perspective, looks at the procurement and the research accounts from 1960 until the present day; the present day being on the extreme right of the chart.

As we can see in the bottom line which are basically the research and development accounts, they remained fairly stable. These are, by the way, constant 1995 dollars. So, our commitment to research has, in fact, been real and it has been sustained.

If you look on the other hand at the chart that looks like a roller coaster at one of our amusement parks, that is the acquisition account chart. It shows that we are on a major downward spiral. A major downward spiral that has put us this year at the lowest point since before 1960; actually since the World War II era in real dollar terms.

The other major down cycle in terms of acquisition was in the 1970's. We know the kinds of problems we have experienced 2 to 3 to 4 years after those major cuts in the acquisition accounts and in modernization were begun.

We hear a lot of the debate in Washington saying that we have got to focus on readiness, readiness, readiness. All of us on this committee agree with that. Let's face it, there is no Member of Congress who is going to allow the readiness accounts to suffer. We will take the money from whatever source we have to, to take care

of the morale, the well-being, and the training of our troops. That will always be the case.

[The following information was received for the record:]

MODERNIZATION (AVIATION)—AVERAGE AGE

The Army's Aviation Restructuring Initiative (ARI) will retire older aircraft and reduce the number and types of rotary wing aircraft. Even with reduced types and numbers of airframes in the force, the average age of the Army's tactical aircraft fleet is increasing now, because of a lack of new procurement. With the slippage of Comanche's Initial Operational Capability (IOC) to 2006, it will not be until that time that a new tactical aircraft will enter the Army's inventory (unless the 2006 IOC is moved up). The average age of the Army's tactical aircraft as of FY 97 will be as follows:

AH–64, 9.7 years;[1] AH–1, 26 years; OH–58A/C, 26 years; OH–58D, 1.6 years; CH–47, 30 years [1] (10 years since CH–47 rebuild); UH–60, 11.5 years;[1] UH–1, 28 years; and RAH–66, IOC 2006.[1]

In 1997, the CH–47, UH–60, and AH–64 will continue to increase in age by 1 year for each successive year.

The Comanche fielding will allow the retirement of the OH–58D and the remaining AH–1's and OH–58A/C's.

In doing that, we are robbing the future readiness of our troops and the future security and safety, in my opinion, of our troops with where we are going right now.

What infuriates me the most is when the Commander in Chief pounds his fist on the table in a joint session and says we are not going to cut defense any further, as he did this past January, and in his acquisition accounts alone, he has cut $9 billion from what he said those accounts would be in this year's budget request. That is absolutely unacceptable.

What I wish we could get to is a stable funding base like we see with the research and development accounts with acquisition. Where we could have some predictability in terms of what is going to be available rather than these massive up-turns and down-turns. We know that acquisition curve is going to go back up again.

The problem is what price are we going to pay? How much additional costs are we going to put into these systems by having this rapidly increasing and decreasing cycle that has occurred since the 1960? We could give any one of you the chance to make an example in your own area or sphere of influence in terms of what impact it is having on your operations. Whether it is on ships, submarines, carriers; whether it is on track vehicles, helicopters.

I just want to take one. I want to ask this question of General Loh. Secretary Perry testified before our committee recently that the 100 fighter aircraft we are procuring each year are sufficient to support the 20 fighter wing Bottom-Up Review force structure.

Unfortunately, as you and I both know, instead of procuring the 100 aircraft, Secretary Perry testified to the Air Force isn't procuring any aircraft; not last year, not this year, and not next year. How deep a hole are we digging ourselves? What procurement rate is actually required to sustain the 20 wing force? What is the dollar shortfall to pay for that?

You may not be able to give me all of those answers today, but I would like to have them for the record.

General LOH. Just quickly, we have been living off of our downsizing for the past few years. We have cut our fighter force

[1] Indicates objective fleet under ARI.

from 40 fighter wing equivalents down to 20. So, we have had a lot of aircraft around to fill up the attrition reserve part and all of that. Now, 1995, 1996 those aircraft are no longer around.

So, as we look to the turn of the century in maintaining just a 20 fighter wing equivalent force, we see a few gaps in the attrition reserve account and some of the training and backup accounts to be able to maintain that.

That is why given additional TOA, we would seek to buy a few F–15E's and F–16's, not to add to the force structure, but to be able to maintain that 20 fighter wing equivalent force with enough aircraft to handle training and backup and a few for attrition reserve.

On another point, sir, I would comment that to make that procurement line more level, I am a strong supporter of sustained low-rate production; particularly in this period of time where we are downsizing the industry and we want to maintain an industrial base.

It is important that we not buy aircraft in bunches like we did back in the past where we would buy them at a huge quantity per year like 300 F–16's a year, 144 F–15's. If we could maintain sustained low-rate production of aircraft or other military vehicles over the long term and do it efficiently, which I am sure that we can, and you can ask some of my colleagues down the table about that, then I think we can avoid these peaks and valleys and be in a position where we can maintain the industrial base, maintain sufficient numbers of fighter and bomber aircraft for the Air Force, and do it in an efficient means with profitability for the industry.

Mr. HUNTER. Thank you, General Loh and Mr. Weldon. I just wanted to mention if members from the industry want to comment, this is your chance to comment and respond to recommendations made by the uniformed side of this panel.

I noticed Mr. England looked like he wanted to say something to Mr. Fitzgerald. Feel free to jump in any anytime if you want to comment.

Mr. ENGLAND. I would like to comment. I would like to strongly endorse what General Loh just said. If we could have even a low level, but a constant level, a predictable level of production for our airplanes, the price would indeed go down and we would then have some base that we could count on in terms of pricing other programs in the future.

The problem is that the rollercoaster, when you predict into the future, you do not know what your business base is. So, it is very hard to know what the cost of a product is. If we could have a sustained level of production, even a low level of production, and it is affordable; particularly if the DOD continues on the course supported by the Congress to reduce the rules and regulations and the uniqueness of the defense industry, to eliminate some of that cost of oversight, those airplanes would be even more affordable than they are today.

I would strongly endorse that. As a way to maintain the industrial base is to keep a low level of production, but do it on a constant basis year after year.

Mr. HUNTER. What is low, Mr. England?

Mr. ENGLAND. Twelve airplanes, 24 airplanes, I mean in that category; certainly not in the 120, 180, 300 in the past, but 1 or

2 airplanes a month of domestic procurement would be very, very beneficial to have that to plan for in the future. Certainly two airplanes a month, in the case of the F–16, would be ideal.

Mr. HUNTER. OK. Mr. Fitzgerald, did you want to comment?

Mr. FITZGERALD. Thank you, Chairman Hunter. I wanted to comment briefly upon Admiral Lopez' remarks. If I heard him correctly, he indicated that he thought the Navy had a solid plan during the 5-year development period.

I respectfully disagree with that, Mr. Chairman. I would note that the Bottom-Up Review identified a required fleet of 346 ships. Because I am in the surface combatant business, I pay attention to the surface combatant portion of that which was to be 120 to 126 ships.

The Navy has since indicated that, that figure is not adequate and the required number of surface combatants would be in the neighborhood of 145 to 149. When we look at the 5-year development plan, it reflects the following. In fiscal year 1996, the number of ships procured is reduced from five to three.

In fiscal year 1997, there are only three ships planned. Fiscal year 1998, the number of ships procured is reduced from six to four. In fiscal year 1999, the number is reduced by two ships; all of that in just 1 year's time. I think whether or not the five-hear development plan is a solid plan, probably invites some debate.

Mr. HUNTER. Thank you. Mr. Skelton.

Mr. SKELTON. Mr. Chairman, thank you very much. General Loh, you missed your big chance. I thought you were going to say that if Congress would buy you a jet airplane instead of confining you to a propeller-driven plane you could get here earlier.

Colonel Palaschak's comments earlier remind me—and I think through the years we can agree that the cash cow for the military procurement account has been in the area of ammunition. Colonel, I appreciate your excellent remarks on it. I know your background and from which you come. We thank you for that.

This question I will ask each of the four service representatives and I ask that it be answered for the record hopefully within 10 days to be delivered to us. Post-cold-war force levels require less equipment than cold war forces. If we meet these lower equipment levels, by retiring the oldest equipment first, we should be able to reduce the average age of the equipment that remains, at least in the near term. Some point, however, average equipment age will begin to increase again.

The question is, when will the average age of the tactical aircraft and surface ships begin to increase? I would appreciate that for the record.

Mr. SKELTON. Now, I have a question for each of the four service Chiefs. I ask this question to be answered in your personal and professional opinion, over and above and separate from the recommendations made by your respective services. We on committee can read and understand the service requirements as set forth in the official statements.

In your personal and professional opinions, if each of your services were given $1.5 to $1.8 billion a year in the procurement account in addition to what is recommended and asked for by your

services, what would you ask us to fund for that $1.5 to $1.8 billion a year for the next 4 years?

Assume that the chairman of this Procurement Subcommittee, Mr. Hunter, would swear on his grandfather's grave he would do that. You can be rest assured for the next 4 years in your procurement account.

Mr. HUNTER. It may not take that much.

Mr. SKELTON. Great grandfather's grave. Assume that you would receive that in addition to the planned procurement that each of your services is getting. I would appreciate an answer. General Loh, I am going to start with you, sir.

General WILHELM. Yes, sir. OK, I will try to take the question head on, sir, and I will just run down my short list. I think I would start with what two of our colleagues from industry mentioned which is our ammunition account which is deficient to meet the two major regional contingency requirements that are postulated in the DPG. I think the next thing that I would do would be to accelerate procurement of the advanced assault amphibian vehicle to get it into the inventory well before the year 2008 when we are scheduled to attain its initial operational capability.

I believe I would accelerate procurement of the light weight 155 howitzer and retire the M–198 which is maintenance intensive and has too slow a rate of fire and imposes too many mobility penalties on us.

Turning to the aviation side, I hope Admiral Lopez won't give me an elbow in the ribs. Of course, we kind of share money with the Navy on that. I would certainly like to see a faster introduction of the V–22 aircraft which is now scheduled to be fielded at $1 billion a year over about 21 or 22 years. I think we could save money and certainly resuscitate our medium lift capability a lot more rapidly than that.

I would like to see some additional money go into the remanufacture line for AV–8B airplane. During the first year we take that proposition on. We will rebuild four. A more economical rate is 12 aircraft.

Sir, I think I may have spent my $1.5 billion and some of next week's allowance, but those are sort of my going in shots.

Mr. SKELTON. The Air Force says they have got everything they need so you can take theirs.

Admiral Lopez, in your professional and personal opinion.

Admiral LOPEZ. If you gave me that kind of money, I would buy a DDG–51 this year. I would buy another one in 1998. I would move the LPD–17 back 2 years. I would buy it in 1996. I would buy a dozen or more F/A–18C's this year, 1996. I would buy F/A–18E's and F's in the out years. I think I have already spent your money. I like big ticket items. Those are the things that we need to recapitalize our force.

Mr. SKELTON. I appreciate that. General Hartzog.

General HARTZOG. Since you asked my personal one on the five operations in the last 5 years, plus a series of gaming and analysis we just completed, I think the biggest payoff would be to split it down the middle.

I would take half of the moneys available and put it into some very invisible and mundane, but essential things. I would buy am-

munition to replace that part of the war reserve stocks that are used up in training; probably in the years between about 1996 and the year 2000. I think we are OK for the next year, but you said about a 3-year increment.

Mr. SKELTON. Four-year.

General HARTZOG. Four-year increment. That gets increasingly important after 1996 for about a 5-year period. I am very concerned. I would spend the other half of that first half of the investment in tactical mobility. I would focus on the middle of the tactical mobility problem.

It is not the light piece. We are in fairly good shape there. We can extend service life. It is not the heavy piece. It is not the heavy equipment haulers. It is 2½ ton and 5-ton trucks that are aging beyond cost effectiveness to continue to maintain.

I would go for an extended program for some of those and for a successor vehicle rapidly to follow them. Half of whatever available funds, I would spend in that way. The other half, generally, I would put into quality of life of installations. I would do that with barracks and housing.

I am particularly impressed with the efforts that all of our young commanders are trying to achieve as you well know with the barracks and housing, but it requires money to maintain our investment there. It is a direct impact on recruitment and the perception of quality of life.

Mr. SKELTON. Thank you.

Mr. HUNTER. Just before you go on, Mr. Skelton, let me just ask General Hartzog, having listened to small arms statement from industry, any concern with small arms, sir?

General HARTZOG. Yes, I do have concern with small arms. I think in order of priority, I would spend some of it that way, but it is behind the first two things. It is hard to separate small arms from the ammunition business as he so well made. I would stick with the ammunition and mobility in the first half, the equality of life in the second half; some piece to maintain momentum in the small arms business.

Mr. SKELTON. General Loh.

General LOH. I have six items on my wish list. I would restore funding to the F–22 program so that it does not get delayed any further and it stays the course.

I would spend some for additional procurement of F–15E and F–16. Maybe 30 to 40 F–15E and 100 or so F–16 over the next 5 or 6 years so that we do not fall below the 20 fighter wing equivalent force.

I would ensure that we fully fund the bomber program; the bomber upgrade program for B–1's, B–2's and B–52's. I would put in escrow a certain amount of that to await the results of the bomber study to see what it might yield in terms of something that we would want to invest in.

I would fully fund the fighter configuration plan that we have put together for upgrading all of our existing fighters. I would fund and reliably upgrade the AWACS because it needs it in the backend where the business is done. I would look at ways to increase the production and the quality of JSTARS.

Mr. SKELTON. Thank you so much.

Mr. FITZGERALD. Mr. Skelton, if I could add something. I want to demonstrate that Admiral Lopez and I have not rehearsed our testimony here today. If I could help him spend his $1.8 billion, then I would spend it on one DDG; bringing back one DDG which has been eliminated this year. I do not believe the LPD–17 design will be ready for procurement in fiscal year 1996.

The alternative might be to move the LHD–7 from 2001 to fiscal year 1996.

Mr. SKELTON. Thank you.

Mr. HUNTER. Thank you very much, Mr. Fitzgerald. I want to thank the ranking member on the Procurement Subcommittee for asking what I think is the best question so far in this hearing.

We are privileged to have both the chairman and the ranking member of the full committee with us, Mr. Spence said he is going to pass his time to give some of the other members a chance to ask questions. Mr. Dellums is recognized.

Mr. DELLUMS. Thank you very much, Mr. Chairman. First, let me congratulate you and Mr. Weldon for your first meeting in your official capacity as respective subcommittee chairpersons.

Second, I would like to compliment you for setting up this hearing. I think the position here is both interesting and thought-provoking and I think quite challenging.

On the one hand you have got the requirements military people here who will be looking at the issue of modernization and procurement acquisition. On the other hand you have got the people here who have a keen interest in the industrial base issues which are not small items.

First, let me go to the chart that Mr. Weldon placed on the wall and just say that sometimes it is important to demystify these things. I recognize that what the gentleman referred to as a roller coaster look on the chart with respect to acquisition and procurement, I would dare say that all of us in our personal budgets, our acquisition and procurement charts would look exactly the same way.

We do not buy a new car every year. We do not buy a new PC every year. We do not buy a new refrigerator every year. We do not buy a new stereo every year. Everybody's acquisition is going to go up and down. It is based on need. It is based on budget. It is based on a whole range of other things.

The second observation that I would make is that if you look at this chart, and I walked over to look at it. The peak year of that chart is 1984. It begins to ramp up quite quickly in the early 1980's. That was what we all euphemistically came to refer to as the years of the Reagan buildup.

Then it started to ramp down in 1984. If my memory serves me correctly, that was during the next administration, the Bush era. If you look at how the chart flattens out, it flattens out in—I am cheating as if I actually can see from here. I went over to look. Although when you get older, your distances, you know, long range is much better.

In 1994, 1995 it flattens out. That is the current administration. The point that I make here is that it seems to me how quickly we forget. I think that what many of us—and I have talked with a number of industry people who in privacy and candor pointed out

that one of the great contributors to the instability in acquisition and procurement was in the Reagan buildup years when dollars came flowing on massive scale. Private industry attempted to absorb these dollars; major overhead, huge capabilities.

Now they had to start coming down as a result of the end of the cold war and the ramp-down and the need to be leaner and meaner and more competitive in an increasingly international environment. A lot of these jobs that went out of the window only in part have to do with the downsizing of the budget.

It also has in part to do with gaining greater competitive capability and being competitive with other people. All of the downsizing cannot be laid, Mr. Chairman, right here at this desk in these chambers. A part of it has to do with the downsizing, but only part of it.

I think it is important. I appreciate the chart. I think that a great deal of work went into the chart. The point that jumps out at you graphically is that we have to move beyond the instability that was generated during that particular period where it ramped up.

When you talk with private industry people away from the witness table, I would imagine some may be willing to say in front of the witness table, that what they are really looking for is some stability. They understood that industry was drunk, as it were, on the wine of the great buildup.

They recognize that those days are over. I hope they are as well. It created tremendous instability. It created great problems. Having said that, let me come back to what I think is a tremendous intellectual challenge for all of us here.

You gentlemen used the phrase "to meet the objectives of preserving the industrial base." I wrote that down because several of you used it and you, sir, used it and several of you did.

Mr. Chairman, the question that I have in my mind is, when our colleagues here used the term "meeting the objectives of preserving the industrial base," are they saying this; that this is the industrial base necessary to meet our legitimate and enduring national security needs?

You see, that is the question we have to ask. That is our fiduciary responsibility. That is why we were elected. That is why we sit on this side of the table. We have to keep asking the industrial-based question which, in my opinion, is a huge intellectual, political, economic, and technological challenge.

What is the necessary industrial base? I would like to know if we are asking the same question; if we are using the same terms. I have to keep asking myself the industrial base issue. I have to ask, what industrial base is necessary to meet our legitimate and enduring national security needs?

That is why they call this the National Security Committee. The question that I have, for example, Mr. Palaschak, when you pointed out that you had gone from 200-and-some down to 80-some-odd firms, those are dramatic figures.

The real question is, how many firms, if you put my shoes on, wear my hat, how many firms are necessary to meet our legitimate and enduring national security needs?

It is one thing to show me the statistics. If you can say to me, Mr. Dellums, we are down from 200-and-some to 80-some and we are now on the dangerous edge of not being able to supply your legitimate and enduring national security needs, then you have all of our attention.

If you, sir, in shipbuilding say we are now down to the point where we are jeopardizing our legitimate and enduring national security needs, that is an important issue. I am here to listen. I have listened to virtually every word that every one of you have said here.

That is my job and that is my responsibility. These are not easy issues to deal with. I try to grapple with them intellectually. I am hoping not to get into a partisan, political issue. This is far beyond all of that. Industrial base questions are very hard issues.

I would like to just as you, when you folks used the term we are endeavoring to "preserve our industrial base," are you in fact saying to me that what we are looking at is the industrial base necessary for you to maintain your legitimate and enduring national security needs?

Am I making my question clear? To me, I think that is the large issue here. It is the question that jolts me. It is the issue that I think is a powerful and an intellectually challenging one. Any of you would like to start with that issue?

Mr. PALASCHAK. Mr. Dellums, I would like to address that if I can since you referred to my testimony.

Mr. DELLUMS. Only as one case in point; not to make any other point.

Mr. PALASCHAK. I understand. During the past 4½ years, the existence of the Munitions Industrial Base Task Force, we have attempted to work very cooperatively with the Armed Forces in trying to assess the condition of the base and its ability to respond to the Armed Forces' needs.

The Army is the single manager for conventional ammunition and it conducted a functional area analysis. I mentioned that in my testimony. Part of that analysis was to look at the responsiveness of the industrial base.

Mr. DELLUMS. I am sorry, sir. People are competing with you and I cannot hear you. Could you repeat that last comment?

Mr. PALASCHAK. Yes. The Army conducted a functional area analysis. Part of that analysis looked at the responsiveness and capability of the industrial base. In their assessment, many of the areas of the product lines our Armed Forces require, require in excess of 30- to 40-some months after they have gone cold to respond to the Armed Forces' requirements.

That was last year's assessment. They also indicated that portions of the base capacity were in their terms going red. In other words, they could not meet the demands of the Armed Forces. I would highly recommend that study be looked at by the committee because it is an excellent baseline for a lot of the work that the task force did in coming up with their recommendations.

The second comment I would like to make is, all of the recommendations from the task force were based not on preserving companies. It was not based on preserving a certain level of funding. It was based upon preserving a capability somewhere within

the base to produce each of the product lines that our Armed Forces require. It has been on that basis that we have advanced any funding recommendations to the Congress.

Mr. DELLUMS. Thank you, sir.

Mr. PALASCHAK. Thank you.

Mr. FITZGERALD. Mr. Dellums, I would like to respond briefly if I may. Let me cite two or three factors that I think might put the industrial base discussion into some perspective.

We are talking about a naval fleet of 346 ships. If we assume a useful life of 30 years, that implies a replacement rate of something on the order of 10 ships per year. If you assume a useful life of 40 years, which I think everyone would agree would be on the high end, that implies a replacement rate of eight.

We are in this 5-year development plan procuring ships at the rate of three; two on the low end and four on the high end. So, we appear to be replacing ships at these procurement rates at approximately half of the required rate.

I think another way of looking at it is to look at the average age of workers in shipyards in this country. It has been rising steadily. While I know the statistics in our own shipyard, I am not sure what they might be in the others. I suspect that ours is representative.

The average age in our shipyard is around 40; a little bit above. We are not hiring anyone. We have not hired anyone for 5 years. We are not going to hire anyone for as far out in the future as I can see. I think that is true with the other five shipyards who are members of the American Shipbuilding Association.

The question arises, can we preserve the capacity to design and build the very complex warships that we are designing and building if we are not bringing people into the industry? I think that each of the CEO's who are members of this association would tell you that there are certain jobs in shipyards, especially complex shipbuilding, that you need young people to do. People with my knees find it very difficult and with my back find it very difficult to do many of the jobs in our shipyard.

Finally, I would note that the other concern that we ought to have for preserving our shipbuilding industrial base is whether or not that kind of a procurement slope is going to permit us to attract the investment capital that this industry needs. As you know, shipbuilding is a capital-intensive business.

Whether or not we are going to be able to make the case to the investment community that they ought to invest their money, their dollars, in shipbuilding in the United States. I submit, Mr. Dellums, that that's a very substantial question that we should be very concerned about.

Mr. DELLUMS. Thank you, sir.

Mr. ENGLAND. Could I make a comment, Mr. Dellums and Mr. Chairman?

Mr. DELLUMS. Yes.

Mr. ENGLAND. Before World War II, there was not a defense industrial base. In the last 50 years base we have grown a defense industrial base with depots and all sorts of things in the country. I will tell you that the defense industrial base today is not part of the general U.S. economic system.

It is a walled-in economic system. It has its own rules, regulations, accounting systems. It has its own auditing systems. Everything is separate and distinct from the basic economic system that exist around it.

In my view frankly, in the future, it will not be possible to sustain that kind of a system with any reasonable dollars available. That is the uniqueness of the system that we have had for the last 50 years. That system frankly needs to go away.

We need a Jericho system. The walls need to come down that are around this defense system. We need to be able to operate more like a commercial firm. It doesn't mean that we do not meet unique military requirements; that we do not have specific technical specialists and that we do not maintain data secret, but we need to be able to operate more like a commercial firm.

Recent studies have said that you can save anywhere from 15 to 20 percent with that kind of an approach. My own view is, my own judgment is that if we could move toward that sort of a system and maintain some of the suggestions you heard here today, do upgrades, low-rate production, do some special type of programs in terms of prototypes, then you could maintain the technology base. You could maintain a manufacturing base.

Frankly, you would have some of our very best talent available to also compete in the world marketplace and compete in this country in terms of other products. I think there needs to be a new approach.

The DOD has started on that approach. Mr. Perry has initiated that. There is a lot of effort. It does require the cooperation of the Congress. I feel like your comments are very appropriate, but it does take a new approach to do that.

Mr. DELLUMS. Thank you. Mr. Chairman, just one quick point. I would say, as you know, Mr. Spence, myself and others worked very hard on the acquisition reform. We have taken some significant steps. I know we have not gone quite that far.

Finally, I would just say to—I'm sorry. Mr. Hardison, you wanted to comment as well? He wanted to comment on the question.

Mr. HARDISON. Well, the small arms industrial base that I looked at is rather small in comparison to the other big-ticket items. I believe the intellectual question that you raised is common across the board.

You will recall that I mentioned there were 14 types of small arms. When we looked at them, I believe that a reasonable person would conclude that for 10 of those, the stocks on hand in comparison with the needs, the length of time required to rekindle production, if the need should arise, and so on was adequate to the point that you really did not have to worry very much about preserving a base and, at some future time, not having to get a new supply in time.

On the other hand there were four, and I called those out, in which the current stocks are below the present stated requirements. At the present level of funding of small arms producers, the three producers that are involved will flatout not be able to stay around as they have been known in the past.

As far as we could tell, you are then talking about if the need should arise in the future to reintroduce production of those four

that are now not available in full quantities. You are talking about investments in factory and equipment if the whole thing goes cold.

Most importantly, you are talking about something like 3 years' lag time. When you look at the importance of the SAW, the grenade machine gun, the rifle, and the carbine play in your mind's eye of the kinds of operations that might occur, light forces, not heavy activities, it seems as if that was a little bit risky. So, our study looked for the least cost ways to preserve the opportunity to reintroduce production without the long lag time that would be implicit if you let the production base atrophy as it is about to do. That was the basis on which the plan that we submitted last year was on.

Mr. DELLUMS. I thank the gentleman for your comments to my question.

Mr. HUNTER. Thank you. I thank the gentleman for a very relevant, very thorough question. Mr. Bateman.

Mr. BATEMAN. Thank you, Mr. Chairman. I would like to compliment you and my colleague, Mr. Weldon, on this hearing. I am finding it a very valuable learning experience in trying to ferret out the answers to the very fundamental questions about our national security requirements.

All of us are going to have disagreements at the end of the day on how much is the need. If we could even agree on the fiscal dimensions of the need, we will always have room for disagreements as to whether we are giving priority to the proper items.

One of the things that as chairman of the Readiness Committee I think needs to be emphasized is that we cannot take comfort in assurances that whatever readiness problems that exist today we can fix very quickly as soon as Congress passes a supplemental or as soon as we pass the President's recommended fiscal year 1996 budget. Readiness, as I have said several times, is not a snapshot. It is a motion picture. We have got to be concerned about our readiness; our capability to field forces to meet the Nation's security challenges in the years to come.

What I am hearing today gives me grave concern in that regard; the sustainment of the level of readiness. I have looked at the chart. I would have to agree that my colleague from California has a definite point. There will always be peaks and valleys when you are procuring things that are very large capital-intensive items.

The other thing that we do not have a chart on and which is disturbing to me, and maybe I should have had a chart maker on my staff. If you took a chart and you looked at reduction in force structure, that chart would show a line coming down rather steeply in a rather short period of time.

If you looked at operations tempo and personnel tempo you would see that that chart is rising. Well, you are going to break a force if you continue too long on that trend. These are the things that concern me.

The reason why, frankly, I am so happy to see this military industrial complex at the table—I do not use that as a pejorative term. I use it as something that I think is indispensable to the Nation's security, short term and long term.

Let me especially welcome my neighbors from America's first district, General Loh and General Hartzog. General Loh, let me com-

ment that I suspect if the usual patterns are correct, the fog is heavier in Washington this morning than it was in America's first district.

I want to ask Mr. Fitzgerald a question. He made reference in his testimony to the Organizational Economic Cooperative Development [OECD] Agreement and apparently problems with it. I think I understand what those problems are. We will give you and other shipbuilders the opportunity to comment on it when the Merchant Marine panel launches some hearings with respect to this OECD agreement.

I would like for you, for the benefit of my colleagues, to tell them what you see as a problem with that agreement which basically deals with restrictions on subsidization of shipbuilding by foreign countries. Would you address that for us?

Mr. FITZGERALD. I would be happy to, Mr. Bateman. Thank you very much. I certainly appreciate the attention that you have paid to the OECD Agreement. We look forward to the hearings that you will convene.

The shipbuilding trade agreement we think will not meet its objective. That is, to create a world market for shipbuilding in which normal pricing will prevail and government supports will disappear. It will not work, in our opinion, because it ignores several fundamental facts.

One, the other parties to the agreement have been supporting their shipyards, their shipbuilding infrastructure, for a great many years while we have not. We have been concentrating on building warships while they have been concentrating on perfecting their business practices and their techniques in building commercial ships.

There is a tendency to believe that if you can build warships, then you can build commercial ships. The fact is all of us can build commercial ships, but it is a drastically different business. It is a drastically different undertaking.

Maybe to oversimplify it and make a somewhat facetious remark; the two businesses are only the same in that both products float. Other than that, there are few similarities.

The trade agreement took, in my view, too narrow a view of what those support practices had been among the other parties. It tended to define subsidies as a subsidy of a portion of the price of a ship. It did not take into account the enormous assistance that those shipyards have received in infrastructure; the benefits of which you of course enjoy for many, many years to come.

You can stop subsidizing the price, but the fact that the Government of Germany is in the process of investing $500 million in a shipyard in the former East Germany will result in that shipyard having an advantage for the next 30 years. The fact that there is that huge advantage was not wellknown, I do not believe, to our negotiators.

Second, the agreement permits those practices to continue in effect for another 3 years. We have no such practices so it is easy for us to comply with the standstill provisions.

There is much talk about leveling the playing field. It is one thing to level the playing field if you are in the same town in which

the playing field exists. If you are not even in the same district in which the playing field exists, that is another story.

The agreement has a basic flaw in my opinion in that it is an agreement whereby the parties have agreed to stop doing something. The agreement does not say what they have been doing and there is no requirement to disclose what all of those support programs were. When it comes to enforcement, how are you going to know whether or not they are not going on?

I think there are a lot of practices in some countries, Japan, Korea especially, that may not be legislated. That they are policy-driven issues that provide means of support. I think we negotiated a very bad deal, Mr. Bateman.

I think the objective was a sound one; to rid the industry in the world of government support, but this agreement will not work in my opinion. I think its final flaw is that it did not take into account the enormous over capacity in commercial shipbuilding in the world.

There is excess capacity currently in the neighborhood of 35 percent. That is predicted to rise to 65 to 70 percent by the end of the decade because of huge expansions underway in South Korea. As you know, when there is excess capacity, that impacts prices. Prices are depressed when there is excess capacity.

It goes back to the comment I made in response to Mr. Dellums a few moments ago. Can you attract investment capital to enter a business where there is no profit? If we had a chart here to show world shipbuilding prices, you would see them coming down very dramatically.

Any U.S. shipyard taking a leap into the commercial market is taking a leap indeed. The company in your district, Newport News, has done so, as you know. They have signed a contract to build two product tankers. I submit to you that they should be commended for taking an extraordinary risk in undertaking that contract. I think the agreement is flawed and we ought to go back to the negotiating table.

Mr. BATEMAN. I thank the gentleman. Might I comment just very briefly. I agree with you. One of the things important about this agreement is that by the end of 1999, even our very, very modest title XI, loan guarantee program, which in the wisdom of this committee and the gentleman from California and the gentleman from Mississippi made possible.

That provision in the fiscal year 1994 bill is what drove the capability of the shipyard that I represent to enter into the first contract in some 30 to 40 years to build a commercial vessel for a foreign merchant fleet.

That program would have to terminate after 1999 for us while foreign countries under this agreement that has been negotiated are given very generous transition provisions even though they have been subsidizing over the past decade or more while we have not.

It is a very serious question and certainly one that the Merchant Marine panel will indeed be pursuing. Thank you, Mr. Chairman. I wish I had time for questions to the other witnesses. I have a number of them.

Mr. HUNTER. Thank you, Mr. Bateman. That question is an important one to us with the expanded jurisdiction of this committee. We will be engaging the issue that you have spoken to. Mr. Fitzgerald, thank you. Mr. Taylor from Mississippi.

Mr. TAYLOR. Thank you, Mr. Chairman. I also want to thank Mr. Bateman for his remarks.

General Wilhelm, I was a little disappointed when Congressman Skelton gave you a proverbial billion-and-a-half extra to spend. There are some of us working to modify the tax cut proposal to try to reprioritize our spending with defense being certainly the priority; deficit reduction being the other priority.

My question is, again, you did not mention the LHD. It is my understanding that if the LHD is delayed to 2001 the price jumps from $1.3 billion to a little over $2 billion. That is a heck of a lot of money to get the same warship 5 years later.

Wouldn't it make sense, since you have a fixed price contract, to build it now and delay the LPH until later? I mean, we have had testimony before this committee from the commandant. We have had it from several of your peers in the Marine Corps. It just does not make any sense to pay $700 million extra for the same ship and get it 5 years later.

Along the same line, I would like to thank Mr. Fitzgerald for doing what I have asked the shipbuilders to do for many years. Obviously, someone got the message across to you all. You are cooperating. I want to thank you for it. It is very important.

Could you answer that for me?

General. WILHELM. Yes, Mr. Taylor, I will be glad to. I was just itching to throw the LHD–7 in there, but unfortunately I have to work with Admiral Lopez every day and he owns the shipbuilding money and he really beats me up when I start spending his bucks. Since, sir, you have given me the opening, I would say this.

The LHD–7, to me, is a very, very important ship, not only to the Navy and the Marine Corps, but to the country as a whole. That ship will round out our ability to have 12 big decks available to handle the worldwide deployments of our Amphibious Ready Groups and our Marine Expeditionary Units which are one of the most utilitarian forces that we have out there right now.

The reason that the LPD–17 was slipped 2 years to the right and the LHD was kicked up to the year 2001 was purely an affordability decision that the Chief of Naval Operations had to make.

Sir, I will tell you, in my perfect world the LPD–17 would come back to about 97 and we would go ahead and take that low-cost $1.4 billion option to buy LHD–7 in 1996. Again, I do not control those funds. Of course, Admiral Lopez in his position, sir, has to address Navy needs across the spectrum from aircraft to aircraft carriers to submarines to DDGs.

Mr. TAYLOR. Thank you, sir. I would like to compliment the panel on bringing to our attention the various serious needs on aircraft procurement in particular with regard to helicopters. I would also like to compliment Mr. Fitzgerald on what you have had to say and would also like to ask you a question.

We have now the Merchant Marine panel. You have mentioned title XI and the need to extend it. What else can the Navy be doing

in a period of limited funds to help our big six do some commercial work?

As you mentioned, there is still going to be primarily defense contractors, but we can broaden their base a little bit and keep some people working by getting them commercial work. What else can the Navy be doing to help you compete?

For example, are they making the most of the David Taylor Naval Research Facility? Are they sharing that just huge amount of information that they have accessible? Are they sharing it with you all?

Mr. FITZGERALD. I believe that they are, Mr. Taylor. I think that within the programs of the Navy, or within the program management of the Navy, they are doing that very well. I would suggest that things that the Navy could do to assist the six shipyards would be to first of all, pay more attention to the OECD Agreement.

The Navy is the one most affected by it. I think the Navy has to develop a position and promulgate a position statement relative to that agreement or they are going to be very surprised by it.

Second, I think that an industrial policy, if you will, with respect to new construction, overhaul and repair work needs to be developed. I think that if we looked out over the next decade and looked at the work available, I think there should be a way to in effect—the portion that in a way would preserve the industrial base that we think is critical at albeit a minimum level.

The third thing I think the Navy could do is support a national defense features commercial shipbuilding program. If such a program existed and if we encouraged the development, design, and construction of commercial ships that would be privately owned and working in commerce everyday, and have the Government pay for defense features in the form of strengthened decks, additional power to meet the military requirements, cargo handling equipment that is essential to military requirements, and call those ships into service when needed to provide sea lift would be a more effective way of meeting the sea lift requirement.

It would also have the salutary effect of helping us learn to get back into commercial shipbuilding and making work available in the six shipyards. There may well be other things, Mr. Taylor, but those come quickly to mind.

Mr. TAYLOR. If I could, Mr. Chairman, just one last question. I was particularly angry, I guess it was last year during conference, and I always try to compliment the Marines, but I am going to point out one time I was not so happy with what they did.

During conference, somehow language was inserted. I think it came from the Senate that allowed the Marine Corps to go out and purchase some foreign made RO/Ros. I was particularly troubled that we had SL–7s in the Merchant Marine ready fleet, the reserve fleet, that could have been used in the interim while those ships could have been built in this country.

I would like you to comment on that and I would like Admiral Lopez to comment on that because the SL–7s are just sitting there and could have been used in the interim while we built something to take their place. I would like to understand who in the heck

thought up that—I'll be polite, but who came to that conclusion and who does it serve?

Mr. FITZGERALD. If you are asking my opinion on that, Mr. Taylor, I obviously do not think it was a wise decision. I recognize the need, but rather than go out and buy secondhand ships, refurbish them at huge costs and still wind up with an old ship, why don't we satisfy our short-term needs with as many charters as we need and build ships in our shipyards, particularly if we had a program for national defense features on ships.

I think the totality of that would serve the needs of not only the Marine Corps, but would serve the needs of our military in general and serve the needs of our shipyards.

Mr. TAYLOR. Admiral, given what is obviously an industrial base crisis with regard to shipbuilding as it is in all of these professions, but this is the one I know a little bit about, how was that decision reached?

Admiral LOPEZ. I must say that I do not know all of the facts because I was not here. As I recall in discussing that decision, those ships—there were a total of 19; 14 were new and 5 were overhauled ships. They were all for the Army.

Those ships that were overhauled, the need under the bottom-up review and for RO/Ros in the near-term were so early. I will have to get you the facts on this, but as I recall it was so early that American ships were not available.

Mr. TAYLOR. But the SL–7s were sitting in the Ready Reserve Fleet.

Admiral. LOPEZ. I will have to get back to you, Mr. Taylor. I do not know that. Obviously if there is an opportunity to provide the business to American shipbuilders, that is what we are going to do. I mean, we are not in the business for providing money to any foreign government.

Mr. TAYLOR. I have never had an official response to that inquiry. I would certainly like to have one. Mr. Necessary took the time to check and see if the SL–7s were available. They were available and it just didn't make any sense.

Admiral LOPEZ. Yes, sir. We will get that response to you.

Mr. TAYLOR. Thank you, Mr. Chairman.

Mr. HUNTER. Thank you. Mr. Saxton.

Mr. SAXTON. Thank you, Mr. Chairman. I would say to all of the members of the panel. Your testimony has been very valuable and interesting today. This is the fourth or fifth in a series of hearings that have been similar to this. Perhaps this one has been the most informative.

One of the things that occurs to me is that I leave these hearings, Mr. Chairman, with mixed feelings on a number of occasions. Today probably will be no exception to that. That is because I think we get kind of a mixed message; a mixed message as to our degree of readiness; as to what our readiness may look like in the future.

Today there has been a little of that. Let me just point out a couple. Admiral Lopez, in your written statement you say, "We have a strategy that will maintain a highly capable technologically advanced Naval force." That is the first sentence in your conclusion.

Yet when Mr. Skelton asked you the question about what would you do if you had some extra dollars to do it with, it did not take

you any time at all to say we need a DDG–51, the ship that was left out of this year's plan.

General Loh, you talked about fighters. You talked about our fighters have always been key to our operations and we will continue to rely on them heavily. My discussion will center on the importance of our fighter force, the missions they perform and how we plan to perform these missions in the future. I took that as an optimistic statement.

Yet when Mr. Skelton asked you the question, you did not take any time at all to reel off a list of projects; the F–22, the F–15, the F–16, the B–1, the B–2 and the B–52 programs. Now I take it from that, that they were foremost in your mind and that they could use a few extra dollars. Yet your statement was fairly optimistic.

General Hartzog, when you were asked the same question by Mr. Skelton you talked about trucks and a number of other things that need to be fixed, replaced and upgraded. I assume that there is a demonstrated need there.

General Wilhelm, when you made your opening statement, you talked about how proud you were of the readiness of the Marines that helped us out of Somalia. So am I and so are all of us. Yet in your written statement—and I think this is a eureka to hear somebody say this. It is great because I think it is the truth.

You say, declining resources present a serious challenge which has our undivided attention. Then you go on to say in another part of your statement, the Marine Corps uses joint developments and other services and evaluates the weapons of allied nations as a means of maximizing the leverage provided by "scarce research and development [R&D] and scarce procurement dollars."

I get a mixed message out of this because when we talked to military leaders who salute their superiors and say, we are going to go in there and let everybody know that we are ready to defend our country and we will be in the out years.

Yet when we get the other part of this message, look between the lines and talk about declining resources presenting a serious challenge which has our undivided attention—and I am glad you said that.

This gives us kind of a mixed message. I guess my question is kind of a general one. You can answer it any way you see fit. What is the essence of the message that you bring us today? Are these lists of things that we really need? Are the trucks really broken? Do we need to address that with extra procurement dollars or are things really pretty good?

I would like to also encourage folks from the other end of the table to comment on this question as well. Why don't you start, General Wilhelm, and we will work our way down and then ask the civilian sector for their comments?

General WILHELM. Yes, sir. Again, I think we get back to the construction I used of health and wellness. Sir, if you ask me today are you ready to go, general, against today's threats as you see it? My answer to you is, yes, sir, I am.

Then you say, hey, how about the General that is going to be sitting in that chair 5 or 6 years from now? Sir, I cannot give you an affirmative answer with much of a warm feeling in the pit of my stomach. What we have got a highly motivated force. You know

that; populated by highly motivated well-qualified and well-trained people.

Again, the equipment keeps getting older, sir. The nomenclatures keep cropping up. I mentioned in my opening statement, if we have a most severely strained Achilles Heel it is in the area of tactical mobility. That really sort of leads its way down through the list of our major ground requirements.

The AAAV which is really the foremost instrument that enables us to project power from the sea which is why this country has a Marine Corps. The current vehicle that we have right now, the AAVP–7, as I mentioned, sir, entered the service in 1971.

Navy ships have to bring that vehicle within 3,000 to 4,000 meters of the beach; not a good place for one of the 36 amphibious ships that will constitute our fleet in the year 2009 to be. We need to go over the horizon.

That vehicle comes to shore at a speed of 5 knots to 8 knots. Sir, we went ashore at Tarawa in the LVT–1 at 5 knots. The AAAV will bring us ashore 20 knots to 25 knots. Sir, I would tell you that Tom Rabaut and his people at United Defense Limited have built a hydrostatic test rig which has already gets 43 miles per hour in the water at 35 tons gross weight.

I look at all of the opportunities that are out there in the future, but of course we cannot reach out and seize them or seize them in a timely way unless our modernization accounts are properly funded. So, for my point, did I make a statement that we are out of balance? Yes, sir, I did. We are putting our eggs in the readiness basket which I think is going to take care of us today. Sir, at current funding levels, by about 1997 the Corps is going to have some difficulty answering the bell.

Mr. SAXTON. Thank you. Admiral.

Admiral LOPEZ. When you get a budget, you balance it.

Mr. SAXTON. You do. We don't.

Admiral LOPEZ. Yes, sir. We are given a budget. To echo what General Wilhelm has said, I think we are ready to do what we have to do today. I am concerned with the future. I said in my remarks that I have got about a $3 billion or a $4 billion biowave out there.

When I was offered up a billion and a half a year, I knew exactly what I would do with it. If you give me another million or a billion I will know what to do with that too. There are risks out there.

We are taking risks in the Navy I think perhaps that no other service is taking. We have taken down our force structure. We are taking down our infrastructure. We have got to make the Navy cheaper to run or we won't have a Navy in the future.

That is the only way I am going to get $3.5 to $4 billion to take care of that biowave and recapitalize our force. We have specific priorities that will modernize the force.

We are buying as much as we can. When I look ahead and I see only 36 squadrons of F/A–18s between the Navy and the Marine Corps in 1998, I am not going to be able to say to you that I can meet all of the commitments I meet today, in 1998. I can't do it.

We can't put a squadron of F/A–18 Marines in Aviano in 1998. We can do our forward presence and the job that is setup for us

with a threat. We can meet two MRCs. Is it tight? Yes, sir, it is very tight.

General HARTZOG. Sir, you made mention of the trucks. Let me deal with this question in two ways. I want to be very specific about two of the things I said and then I will backup to the bigger statement.

A 2½ ton truck is a real bear to maintain. It is the same bear that it was for my father to maintain because it is the same truck. As we extend the life of those to try to be as economical as we possibly can be in managing the trucks given to us, we find that it takes about three trucks to make one for the extended service life.

In order of measurement of where we are in that program is three to one which brings about other economic decisions and use of monies. We said that the ammunition was a place where we would put additional monies today if we had it. Some of that is predictable. We know that we are going to expend some ammunition in training; certain categories of it.

Because of the stock levels that we currently have in training and war reserve stocks, we know we are going to have to migrate some of the things out of war reserve stocks for training. There is reason to do some of that.

The estimates are that by about 1996 through a window until about 2000, unless we do something about funding that, we will not have enough to meet our commitments in that time frame. That is why I focused on those two things.

The other thing I said was half of whatever monies available we would put into quality of life programs. I will not make any comparative statements here, but I do know that the Army is based on people. We have a lot of them. They are the center of what we do.

We are concerned about both the welfare of the soldiers and the families and how they live from day-to-day. We all have horror stories about trying to upkeep real property. We have fixed facilities both for training and for living.

They are in a position today where to maintain the kind of quality of force that we need for today and the future, we have to do something about those fixed facilities. Those are the two things that impact today in the near-term.

Both of them, taken together, will not make us as ready in the mid-range as we are today. So, it echoes the same sort of thought that you are mortgaging today's readiness for future readiness and we don't want to do that.

General LOH. Well, just very briefly, let me see if I can explain what appears to you, sir, as a contradiction. In my business we have downsized significantly. We have cut our fighter and bomber, our power projection, power forces in the Air Force by 50 percent; not 25 percent, 30 percent, 33 percent; by over 50 percent; 70 percent in bombers; 48 percent in fighters.

We have downsized. Our OPTEMPO is up as a result of that because today I have got 8,000 people deployed and over 100 aircraft deployed around the world doing various operational contingencies.

At the same time, we have only cut our infrastructure about 15 percent. There is a problem. We have cut our operating forces by half, but our support forces support our infrastructure system by 15 to 18 percent.

I heard earlier in this hearing that we could free up a lot of money for investment in new equipment and in modernization if we could eliminate the overhead. Get rid of some of that infrastructure and support structure.

I would encourage you to do that. I believe that there are significant opportunities to improve our position in research, development, investment and acquisition if we get rid of the overhead. Any good company that wants to stay globally competitive in this country cuts its overhead and keeps its production.

Mr. HUNTER. General Loh, I know this has been a long question and I know we need to get to other members. We cannot let that statement go by, I think, without simply asking the question, as I understand the five Air Force depots were all erratically candidates for the base realignment and closure [BRAC], for this last round of BRAC and when the smoke cleared and the list was given by the Air Force, by your service to Department of Defense [DOD] and then by DOD to the Commission, none of the five depots were on it.

Whereas, I think the Navy had six depots in the last round and offered up three for closure and three were closed. What happened?

General LOH. I can't answer that question, Mr. Chairman. I am just citing for you the situation that I face which is a significant cut in my operating forces and trying to come to grips with what this committee is working toward and that is, how do we maintain a level of investment for the future for force structure and modernization in the future?

I think there are opportunities to continue to work at getting that tooth-to-till ratio back in balance.

Mr. SAXTON. If I may just break in here for a short question. General, is it fair for me to conclude then that whether we resource you with dollars that are appropriate from here or whether you are resourced with dollars that are saved from infrastructure, either way you need more money?

General LOH. I think the size of the defense budget is probably about right, given all of the priorities that all of us face. I am just saying that we ought to look at how that budget is allocated between research, development and acquisitions, the subject of this committee, and indirect operations and support, infrastructure and support and operation and maintenance [O&M], direct O&M that buys today's readiness.

The three legs of the stool of readiness, force structure and modernization in my opinion need to be about coequal in importance. In order to freeup funds for future investment in procurement in R&D one should look at continuing to try and downsize the support and infrastructure.

Mr. SAXTON. I did not mean to put all of you on the spot. I do appreciate very much your frank answers. I will take you off the spot. Anybody on the other end of the table want to comment?

Mr. ENGLAND. I will just reiterate.

Mr. HUNTER. The intrepid, Mr. England.

Mr. ENGLAND. Mr. Chairman, again, this is this issue of infrastructure. I mean, again, we know there are documented large amounts of money in infrastructure accounts that are not value added. They are to maintain the status quo. The system has been

in place for a long time. That does have to be looked at. There is significant money there that could be put into modernization accounts.

Mr. HUNTER. Thank you. I want to thank my distinguished colleague for a very thorough question and a very important question. Mr. Geren.

Mr. GEREN. Thank you, Mr. Chairman. I want to add my words to those who thanked the Chair and the ranking members for putting together this very informative hearing.

Before I ask my question, I want to welcome my friend and my constituent here, Gordon England. I appreciate very much his participation in this hearing. I want to just recognize him for a lifetime of service to our country in the defense industry.

I am sure many of you know this is his last month at Lockheed. He has done an extraordinary job there in his present capacity and in previous service. You have been a real asset to this Congress and to this country, Mr. England, and we really appreciate you devoting your career to serving our country in the way that you have.

Mr. ENGLAND. Thank you very much.

Mr. GEREN. Thank you very much for your great work.

Mr. ENGLAND. Thank you.

Mr. GEREN. We have covered so many areas in this hearing it is hard to know where to confine your questions. I just want to touch on a couple of things and then focus in on one area that had not been adequately developed, I don't think.

General Loh, I am glad to hear you reaffirm the importance of the F–22. As you, I am sure, know last week one of our colleagues offered up the F–22 as a bill payer for other programs, very important programs, but offered that up in the appropriations committee as a part of the rescission package. It is important that we continue to reaffirm these very high priorities as you have today and not let us forget the importance of them.

In this very tough budget climate, things such as that rescission offered last week may seem insignificant, but in this climate I think it is important to make sure we understand what the priorities are.

General Wilhelm, in your list of priorities, you talked about trying to speed up the deployment of V–22s. In trying to work within the budget numbers that we have, one of the suggestions that has been raised has been the possibility of taking some money out of the accounts for the 46s and maybe trying to reprogram some of that and shift it into the V–22 account.

If you think there are some possibilities to that, I look forward to working with you and the Marines as we do try to find some ways within the budget requirements we have to move that program ahead a little bit.

Let me now turn to an area that I would like to hear anybody on the panel comment on. It was raised by Mr. England. We do need more money in the modernization account. There is absolutely no question about that. I am hopeful that we are going to get some more. Low rate production, I think, is going to make a great contribution to maintaining our industrial base.

I think we also have to be innovative and look at some of these other areas where we can perhaps achieve some savings and also

supplement whatever we are able to do out of the pockets of the American taxpayers.

Two points raised by Mr. England; one, is foreign military sales and the other is allow private industry to participate on a broader scale in depot work. That perhaps ties into a question that was directed to General Loh about the depots a few minutes ago.

I do not think we can continue to just look at foreign military sales as serendipity. I think if we are going to maintain our industrial base, we need to think much more strategically about foreign military sales [FMS] than we have.

In some cases, I think we have stumbled and allowed other countries to get FMS that we should have gotten. Regardless of what has happened, in the future I would like to see us develop a strategy which we are a little more targeted in our FMS efforts and try to work so they supplement specific areas of need in our domestic industrial base.

I would like Mr. England to first comment on that. I would be glad to have anybody else talk about it. FMS sales, what kind of barriers are there to our domestic industry participating? What should we do in the future to expand that? And then also depot work if we have an opportunity to get to that.

Mr. ENGLAND. Mr. Geren, thank you. As I commented, FMS is very important because it is now 85 percent of the production base in Fort Worth. I am sure that is true in a lot of the defense plants across the spectrum, not just fighters.

We do need some sort of integrated strategic policy for FMS. It appears that each one we address on a case-by-case basis rather than looking at a broad region. There are areas of the world where we are not allowed to compete. That is very disturbing because other countries in the world do compete very rigorously.

Right now that is of course all of South America where we are not allowed to compete, but other companies and other countries are there. Therefore, we loose sales and we also loose the control and the influence that goes along with those sales. Certainly, I would second that we do need that.

There are barriers. There is also a lot of cooperation with the companies and with the Department of Defense and with the State Department. Most of the barriers have to do with technology; releasability type issues. Again, I would say that is a strategic issue.

Where we have friends in the world, that is equivalent to a forward deployed force. Indeed, if we can have a forward deployed force with equipment very similar or like the U.S. military, I believe that provides us an added degree of security.

So, the releasability issue is very important. It does have to be looked at on a regional basis I believe rather than on a country-to-country basis. I would support both of your comments there, Congressman Geren.

Mr. GEREN. Thank you.

General LOH. May I make a point about that, Mr. Geren?

Mr. GEREN. Yes, sir.

General LOH. From an operational standpoint, today it is more important than it has been in the past that our friends and allies around the world operate U.S. equipment rather than another nation's equipment.

It was not so important in the past when we had large in-place forces in Europe and in the Pacific and we could inter-operate reasonably well because we were always there. Now we are not there as much. We are home.

Some of those linkages with regard to access and inter-operability have been severed. To the extent that our allies and security partners operate our equipment and are linked because of inter-operability, common tactics, logistics, inter-netting and so forth, we can restore a lot of that access.

I believe, for the free world, increase the overall capability of our forces because we do operate similar equipment. So, there is a strategic strategy component to this question of foreign military sales that I appreciate your bringing up.

It is important, from my standpoint as an operator, that we be able to inter-operate and standardize procedures and tactics with our allies. We can do that much better today if we operate common equipment.

Mr. GEREN. Thank you, General.

Mr. ENGLAND. Mr. Geren, let me comment on depots first. You asked for a comment. Let me just make a view on the depots. As has been mentioned, of course, large infrastructure cost is just part of it.

I think the real cost is the modernization issue. We heard the Army speak about information systems were going to be the future for them. I can tell you that any commercial company and information systems, those systems will get changed out nowadays probably every 2 years and maybe even less.

I can tell you if the Army puts their information systems into the depot systems and put a lot of money into those systems, then it gets so hard to change the support systems in the depots. Many of those systems will not get changed out because the cost will be too high.

In fact, you end up with very, very old equipment. The cost of the depots, this infrastructure, is not so much the cost of doing it in dollars. It is the cost in that the systems are not modernized that the soldiers fight with.

If indeed we could have more of a commercial type system where it was traded out; I mean, equipment was upgraded because that was the logical and economical thing to do, we would have more modern equipment in the field and we would have it at far less cost.

Again, I believe there is a more strategic view of this than it is just looking at a particular system and deciding where we should maintain it.

There is an issue about how much of this infrastructure that we keep in place and how do we proceed in terms of the general economic system that is in place in this country and that happens to function very, very well, particularly in all of these new technology areas.

Mr. GEREN. Thank you. Mr. Flater.

Mr. FLATER. Mr. Geren, I would like to endorse the comments by Mr. England, but I would also like to point out that the main thrust of the testimony that we have made today about the rotor-

craft industry in the United States is that it is essential that we maintain international competitiveness.

This is an industry that is rapidly becoming near totally dependent upon foreign military sales. We are watching five major programs come to termination in 1997. Whether those production lines will remain open or whether they go black will depend in large part upon their ability to remain competitive in world markets.

There are some obstacles to us in these markets. Technology transfer limitations are some. Geographic barriers are others. The key to us I think in this industry, and I think Mr. Dellums asked an extremely probing question. It is not that we maintain necessarily four hot strong airframe manufacturers in our industry. That is not really what our goal is in this country. That is not our goal in this industry. The key is maintaining those core competencies and those capabilities so when the nation's national security says we need this ability today, it will respond and it will be there.

We have seen in the course of the last 5 years a reduction in personnel in our industry that I have documented of 26 percent. When and if these programs go black, we will see another reduction of 25 percent.

The question I am trying to deal with and I think the question that Mr. Dellums is dealing with also is, what will be the capability of this industry to respond 5 or 6 years from now when we have seen such losses?

Will we have enough aeronautical engineers to design the next advanced scout reconnaissance aircraft or transport aircraft? I do not know the answer to that. We are seeing very rapidly some significant changes in my industry and those of the other gentlemen here at the table. Thank you very much.

Mr. GEREN. Would anyone else like to comment on that?

Mr. PALASCHAK. Yes. The task force conducted a very extensive study of the international market. As the funding within the Department of Defense decrease so rapidly, we were looking for other ways to sustain the skills and the capabilities of the industry.

What we discovered was about a dozen barriers specifically that you asked about, Congressman, that interfere with the ability of industry to really maximize the market.

Currently, the munitions industry averages about $100 million a year in direct commercial sales internationally. When we examine the weapons platforms, the U.S. weapons platforms that are sold throughout the world, and just looked at buying one combat load for that weapon, that tank, that aircraft, we discovered that the market should average around $500 million.

Why couldn't we do it? There are a lot of reasons. As I said, we have identified at least a dozen. There is a fundamental inability of the industry to compete for small orders because of some of the policies in place.

We are working right now with the Department of Commerce, the Department of State and the Department of Defense in a cooperative effort addressing each of those dozen issues that I have described.

I would be happy to provide more detail on that at your convenience, sir.

Mr. HUNTER. If I could interrupt, Mr. Palaschak and Mr. Geren. All members of the testimony panel this morning are invited to submit to the committee all recommendations or any recommendations you might make in any areas.

I know some of you have already participated in studies and reports. If you have recommendations for making the defense dollar go further now, please feel free to submit them.

We will leave the record open. We will make them a part of our hearing process. Thank you. Mr. Geren, go ahead.

Mr. GEREN. Thank you. I do not know if anyone else would like to comment, but I appreciate the observations of the panel on this subject.

Mr. Chairman, as we do deal with that graph that Mr. Weldon put up on the wall over there, I am hoping we can reverse that trend. I doubt very seriously if we are going to reverse it to the point where we are all satisfied with what we are going to be able to do out of the taxpayers' pockets on the modernization issue.

I think that this FMS issue deserves extra attention when you consider what a tremendously high percentage of our industrial is now supported by FMS. I think as Mr. England pointed out, we would never allow ourselves to be in a position where we bought all of our aircraft from a foreign-owned company.

We are in a position where our domestic companies are totally dependent on foreign sales. There are significant aspects of that, that I think ought to be examined by this committee as those percentages increase.

Thank you, Mr. Chairman. Again, I want to thank this panel for a very excellent presentation today.

Mr. HUNTER. Thank you, Mr. Geren. Let me make an administrative announcement. Mr. Buyer will be next. We have five members who are here who wish to ask questions. The order I have them in is Mr. Longley, Mr. Tanner, Mr. Abercrombie, Mr. Evans, Mr. Edwards, and Mr. McHale. Mr. Buyer is recognized.

Mr. BUYER. Thank you, Mr. Chairman. This is a great panel and a lot of very good issues. To General Hartzog, let me welcome you specifically to the committee. I know this is the first time that I recall you being up here in this command. Let me extend to you also congratulations to your new assignment as a TRADOC commander in the Army.

How well you know that inside the PT barracks at the Citadel there is a plaque by Robert E. Lee that says that duty is the sublimes word of the English language.

Not only to you, but the other gentlemen that are with you are excellent in exemplifying what duty, honor, country means. That they are not just words. Let me conclude with that by saying that the spirit and the pride of the Citadel goes with you, General.

General HARTZOG. Thank you.

Mr. BUYER. I have got several questions. My mind has just been swimming as I have been listening to a lot of these issues. One of my buzz issues deals with foreign military sales. I am going to jump into that one. I have got some specific questions for the Marine Corps and one for you, General Loh, if I have got the time.

Let me share with you. It bothers me when I sit over here in these shoes and have to look through these glasses at a lot of dif-

ferent issues. With regard to the industry and defense contractors, your responsibilities are also in regards to profit; responsibilities to your stockholders and to a bottom line. When you are over here on this side and looking at it, the responsibilities go far beyond with regards to profit.

I am one that gets distressed when I hear members of the industry get upset with regards to barriers. That you want to have access to sell to whomever. I am one that says, we ought to make sure that we sell to the right people and are the barriers the correct barriers?

I am one that may be at odds with some of the things that you are saying. I think we are really on the same team though. It is an issue that even when I was in Russia a few months ago and met with the chairman of the defense committee of the Duma. I brought the issue up with him.

He was hot that I would even bring up the issue with regards to controls of foreign military sales because, who are you of the United States to bring up that issue with us when you look at what we are doing in regards to foreign military sales compared to you?

I said, well, you are absolutely right. I mean, I do not have any problems with that. I am here talking as leader-to-leader with regards to responsibility in the world. What is driving this—and I will just tell you a quick little personal story.

The avenue of death outside of Kuwait City, the Air Force dropped a couple of nice precision bombs right at the crest of that hill that backed up all of that traffic. Inside one of those craters was an ammunition truck. There were several things in there. At the back of this ammunition truck, I took off one of the crates. I have it in my basement at my house. I kept it because stamped on the top of it was Omahn, Jordan.

I know it should have been in Arabic. Why is it in English? When I opened it up, it is grenade launchers and all of the instructions are in English. I remember that King Hussein said that he was not giving arms to Iraq and therefore these weapons were not being used against us.

But my gosh, here they are. Weapons being used against our own; our own Marines and Army that are on the ground; our own weapons for crying out loud. So, I finally had the opportunity last year—I had been waiting for years to see King Hussein of Jordan.

So, I asked him. I asked him the very same question. You told the world that you were not giving these weapons to Iraq and I found this just outside Kuwait City. Explain it to me. The King of Jordan said, "Ah, with this question I have remained most tolerant." That is what he said.

What he explained to me was that these were weapons that he did obtain with the aide and assistance of the United States to supply to Iraq during the Iran-Iraq war. In the question of the foreign military sales, gentleman, if you are going to be setting up for barriers, I am anxious to look at them.

I want you to know that I am one of them that gets a little distressed when I hear, my gosh, we are doing all of these cuts and we have to survive, sustain and maintain our industrial base so we sell to anybody? No.

So, if you get upset that, gee, well then China is getting access. Wait a minute. I am one of them that is pretty distressed. When the chairman of the Duma gets upset with regard to Yugoslavia, here is how the thing finished.

With Yugoslavia he said, my gosh the United States, now you are no longer policing the United Nations [U.N.] arms embargo with Yugoslavia. I said, well, you know what? Who is selling those arms over there to the Croates and the Muslims?

Oh, he had this big grin on his face. And I said, that's right. Responsibility. The responsibility that I have to the United States is no different than the responsibility that you have in Russia. As a matter of fact, I am going to see him this afternoon at 2:45.

It is no different because you sell the arms to China. China sells them to Iran. Iran then flies in and drops them off to the Islam regimes in Yugoslavia. You have got AK–47's killing AK–47's. So the responsibility goes beyond even our own borders.

You see in Russia, they are also struggling with the industrial base just as we are struggling with it. I am anxious to have a dialogue on the issue.

Let me jump over to the Marine Corps real quick. General Wilhelm, you stated in your testimony the Marine Corps budget has allotted over 35 percent of its procurement budget to the commo gear; your C^4I. I understand that the Marine Corps is having trouble with your M–16A2 rifles.

The emphasis on the commo gear is not there with regard to the emphasis on the enhanced rifle. Can you kind of help me out with that one.

The other one is that in 1944, 40 percent of the M–198 howitzers in the Marine Corps were combat deadline due to cracks. Is the procurement of the new light weight howitzer a priority for the Corps? If so, why is it not mentioned in your testimony?

General WILHELM. Let's see, sir, I will try to take those in order here. First on the subject of the M–16A2. First, sir, I do not know of any problems that we are having right now with the M–16. I think it is functioning satisfactorily.

As far as wanting to get on board with the Army with the development of the new infantry rifle, yes, sir, we certainly do. However, our current research and development account just does not give us the money to get into that.

You mentioned that in my statement I indicated that 35 percent of our current procurement budget is going to the area of C^4I, that is correct. The principal buy there is our attempt to buy out our requirement in the single channel air-ground radio system.

As I mentioned earlier in response to a previous question, sir, with only $474 million in the entire procurement account for fiscal year 1996, we are trying to get the maximum leverage that we can with those limited dollars.

Obviously, there is not much big game we are going to shoot with that. So we are buying out things like C^3I systems that will enhance our inner-operability and give us more leverage for the near-term.

Let's see, sir, could you give me your third question again?

Mr. BUYER. Cover the howitzer.

General WILHELM. The howitzer, yes, sir. The current howitzer in our inventory now, sir, I think you are aware. We use the M–198 for both general support and direct support. With the exception of a few antiquated M–101's that have been left behind for ceremonial firing and to answer some of our range restrictions on Okinawa, for all practical purposes, the M–198 is it for us.

That howitzer has really encountered some so significant problems with metal fatigue. The towers housing the equalibater screws and the travel locks have been the most stressing problems.

Mr. BUYER. Is the procurement of a new light weight howitzer a priority?

General WILHELM. Yes, sir. That is one of our top four ground priorities; procurement of the light weight 155. I think you are aware, sir, we are in a joint program with the Army on that. We have developed a joint operations requirement document which should be signed this fall. Of course, that calls for a howitzer of 9,000 pounds or less that will deliver us 30 kilometers of range.

Mr. BUYER. Thank you, Mr. Chairman. I like this. Gee, let's just keep going. What is this vote? We will stand in recess.

[Recess.]

Mr. HUNTER. I do not know what we call that in parliamentary parlance, but Mr. Longley is recognized.

Mr. LONGLEY. Let me just note for the record that it has been awhile since I went jogging with the chairman of the Procurement Committee.

I would like to follow up on a couple of issues. First, some of the questions that were asked by Representative Taylor on the issues of domestic versus foreign-built ships in the reserve component and the sealift component.

I guess I am concerned to the extent that we are buying used foreign-built ships instead of buying domestically produced ships. I would be interested in learning more about that. Mr. Fitzgerald.

Mr. FITZGERALD. I obviously do not think it is in our interest to do that at a time when we are struggling to maintain the shipbuilding industrial base that we buy foreign-built ships.

Now, we also have to address the short-term need. We cannot ignore that. I am suggesting that while it may not be a perfect answer—for short-term needs is at least something that should be considered, while we are continuing with our strategic sealift construction program that is underway. As I said earlier, added to, I would hope, a program by which national defense features could be placed on ships.

Mr. LONGLEY. Let me just interject. I would appreciate it if you could touch on the readiness question in terms of the practices that we have been following; whether or not they have been working; the condition of the ships. What are the costs involved? Are we saving any money? Is it costing us?

Mr. FITZGERALD. I think we have had a problem in terms of readiness. If you will look back at Desert Storm and look at the periods of time that lapsed before ships were available. I would say that we do have a readiness issue.

Mr. LONGLEY. What would be the implications of potentially installing national defense features on commercial ships? In terms of cost, are we going to be ahead or behind the alternative?

Mr. FITZGERALD. Well, I think we would be well-ahead. I think it would be a good deal for the United States. It is done in the aircraft business, as you may know. While I do not know exactly what the cost would be of the national defense features that might be required, I would suggest that probably in the range of $30 to $50 million per ship. So, if a fast sealift ship costs $300 million, you could acquire 10 ships with capability with national defense features for the same price. I think while it is not an answer to the entire problem, it is an answer that needs to be considered. I think it makes economic sense.

Mr. LONGLEY. I want to lead into a broader question as kind of a bridge to that. I note that the fiscal year 1996 budget is for about $5 billion for three ships. Is that consistent with what is necessary to maintain the 346-ship Navy?

What are the implications of that number in terms of what domestic shipyards need in terms of a mix of defense and commercial ships to maintain the industrial base?

Mr. FITZGERALD. Well, three surface ships, surface combatants, a year will not replace the surface ships that need to be maintained in a 346-ship fleet. I went through some math a little earlier that said that procurement rate is somewhere between a third and a half of what it should be.

As far as the industrial base is concerned, absent some significant other work, a procurement rate of three ships a year will not sustain the capability that currently exist and will not permit us, in my view, to maintain the critical capability necessary.

Mr. LONGLEY. How many ships a year should we be producing?

Mr. FITZGERALD. Well, it is a combination of ships for the Navy that we ought to be producing, but also other work. This has to be balanced by other work. The solution cannot be exclusively ships for the Navy. A combination of ships for the Navy, at least in the surface yards, of not less than three if there is other work available.

If there is not other work available, then the number has to be higher than three. So, we ought to be concentrating on what we can do together to make sure that, that other work is going into shipyards that will maintain the capability that the Navy needs.

Mr. LONGLEY. I would like to ask a broader question and extend this to every member of the panel. It is a subject that really has not come up to my satisfaction during this hearing.

By the way, I want to compliment the chairman on an exceptional panel and an exceptional morning. It is the whole question of—what I would view as the changing requirements of warfare. Specifically it is clear to me anyway that Desert Storm was not an anomaly.

That the force that shows up with the bullets, the bombs and the missiles that it needs, when it is needed, where it is needed, and with the technological superiority that is needed is going to prevail at a velocity that is far greater than we may have customarily experienced.

If you will, I am going to use the term "velocity;" not just the speed with which we communicate, but the speed with which we execute and its implications for modern warfare. I want to pick up

on Mr. Dellums' earlier comment. Again, I am deeply appreciative of his assistance to me as a new member of this committee.

He pointed to the chart and specifically the high years I believe of 1984, 1985, and 1986. It caused me to reflect on the fact that I served in the Marine Corps during the period of the low years and experienced firsthand the declined readiness, the personnel problems, the difficulties with equipment, the shortages of equipment, the personnel that did not receive the training that they needed to receive.

Given the fact that—and I want to pose this as a question. I guess to the military side of the panel, I would ask them to comment on the implications of velocity for modern warfare and what it means in terms of our procurement schedules.

Assuming we maintained an industrial base, are we going to have this 6, or 12, or 2, or 3 years that might be necessary to mobilize that base and use its productive capacity?

From the standpoint of the contracting side are there some advantages, potentially cost savings, and greater efficiencies, that could be achieved through a greater level of consistency in funding?

If you will, go to the chart and kind of pick on the other side of the question that was posed by Mr. Dellums. If we drew a line somewhere in the middle and maintained that consistently without getting into the boom and the bust that we have seen historically, what does that mean militarily? What does that mean from the standpoint of the industrial base? For everyone on the panel, Mr. Chairman, if you do not mind.

Mr. HUNTER. The next 2 hours are now allocated. I would ask those that want to respond to respond if you could efficiently. We are going to be finishing up. We have to be out of here by 1:30 p.m. We would appreciate your help there. I thank the gentleman for his question.

Mr. LONGLEY. Thank you, Mr. Chairman.

General LOH. Let me just comment briefly. I think in terms of velocity and being able to predict what is going to happen in the future, none of us has a clear crystal ball about that. In terms of investing in systems, we need to, in my opinion, invest in systems that provide a great deal of flexibility and versatility that can be used across a wide array of potential conflict action avoid investing in systems that have only a single purpose for a single mission against a single scenario kind of a thing.

Many of our systems do that. Aircraft are suited to that. Many of our munitions have applications across the board. Fighters, bombers can be used in a variety of scenarios. I would just continue to encourage you since we cannot predict well into the future that in terms of velocity and maintaining an investment base for future systems that we recognize a certain amount of flexibility and versatility in our systems.

I think that is very important. We could mobilize maybe for World War II. No one at this table has been able to produce a piece of equipment in under 6, 7, or 8 years. The acquisition cycle seems to get longer and longer.

We cannot gear up when we see something happening out there in the short term. We have to fight with the systems that we have

today or are getting in the near-term. That argues toward flexibility, versatility and low cost of ownership.

Mr. LONGLEY. If I could just follow up and make sure that we are understanding each other. Is the doctrine of the services reflecting the fact that a conflict today will arise much more quickly and be resolved almost immediately? What are the implications for the procurement decisions that we might be asked to make?

General HARTZOG. Sir, if I might add, four disjointed random thoughts that come to mind. Specifically, your word "velocity" I suppose we would put TEMPO toward. I think it is related. It may not be the same thing, but close. I think there is a high probability for a shorter notice series of activities across a much broader spectrum of possibilities of the nature of that sort of thing.

The four notions that come to mind from an Army perspective are: First, strategic lift, and a flexible strategic lift, is more important than ever for us. I think with this versatility, short notice, and TEMPO are velocity.

You are unable to put your eggs into a defined basket. So it has to be in flexible baskets. So, things like C–17 with its outsized capability, short landing capability; things like up-loaded prepositioned ships are very important to responding to the flexibility dimension; the front end of TEMPO.

Second, for a lot of years we have used sort of a statement of imperatives to describe our force. Things like doctrine, force mix, modernization, training, quality people, and leader training; the imperatives that together give us the equilibrium necessary to do our business.

It seems to me that in a time of rapid TEMPO, tremendously increased TEMPO, equilibrium between those pieces is even more important. If you get out of sync in any one or two of those to the expense of others, you will have an incoherent whole. An incoherent package will not be able to be effective in maintaining or responding to velocity or TEMPO.

Third, I think in the information business, one of the biggest challenges and at the same time most exciting possibilities that we see for the future is the ability to have common situational awareness.

A challenge because in the past the Army particularly has been a hierarchial organization. The general says to the colonel says to the lieutenant colonel says to the sergeant says to the soldier. We are at a point today and will be more so rapidly in the future where all of those people can see almost all of what there is to see or hear about the battle simultaneously or near simultaneously. That is a challenge because we have to accommodate this very horizontal capability with what was and is today and has some good reason to be a vertical organization.

It also has to do with TEMPO and awareness. If we all see the same things about the battlefield at the same time we can respond more rapidly to it, if we are trained and equipped to do that.

Finally, to the chart and what that has to do with TEMPO. I am not bright enough or schooled enough to know precisely what the equation is, but there is some equation. There has to be some equation, an optimal relationship, between the gross top line and the

gross bottom line to ensure momentum and steady projection so that we do not have a bubble in the system.

All I know is that in 1985, in the Army's perspective, it was about four procurement dollars to every research and development dollar. That produced what we had at 1985 and just after that. Now, we are at about one-to-one or close to one-to-one.

I do not know what to draw from that conclusion. I will go ask the bright people to do it and submit that as I am able to. There likely is an optimal one; three-to-one, two-to-one that ensures momentum and development, and does not put a bubble in our ability to deal with velocity or TEMPO.

Mr. LONGLEY. Thanks General.

Admiral LOPEZ. I could not disagree with anything that General Hartzog and General Loh have said. I might just add, in fact bringing back to one question you asked Mr. Fitzgerald.

Basically, our ships, we expect to last about 35 years. That is the DDG–51 and 350 ships requires 10 ships a year. They all will not be DDG–51s. That is a balanced force. We cannot afford that. So, we are buying as much as we can and refurbishing what we can to make our ships last longer.

Ships are awfully important as General Hartzog alluded to. The figure that jumps in my mind when you mentioned Desert Storm is that 96 percent of what got there went by ship. We supported all of the services, including ourselves.

With respect to execution of warfare and events rising quickly, I think that is the forte of the Navy and the Marine Corps that demands forward engagement. I think all of the services have to be rapidly mobile.

In particular, where their land forces can be, they needed to be forward engaged and the sea-based forces need to be forward presence with at least three theaters with carrier battle groups and ARBS.

I do not think we will have 6 to 12 years. I think that was the figure you mentioned. We are going to go to the party with whatever we have on.

Mr. LONGLEY. Thanks Admiral. General.

General WILHELM. Mr. Longley, as you might appreciate, I think I can make my answer fairly brief here. I am going to go to an old device I call the four Bs that I use with the lieutenants who are at the Basic School at Quantico.

They frequently ask me, General, how do you see future wars? I look at them and I say, young man, your wars are going to have to be fought under the four Bs. They must be brief, brilliant, bloodless, bargains.

All of those four points to me get to the heart of velocity. The war has to be short. You have to get there quickly with the decisive force. You have to fight smart. You have to win quickly. You cannot spend the lives of America's youth in large numbers to prevail or you will loose domestic support. My answer to the velocity question is my four Bs.

Mr. LONGLEY. I appreciate that, General. Members of the panel in terms of the implications that this might have to our industrial base, if we can find a more level means of funding. Mr. Fitzgerald.

Mr. FITZGERALD. I am not sure I can add much to what has been said, Mr. Longley, at this point.

Mr. LONGLEY. Anyone else?

Mr. FITZGERALD. Plus, I have talked too much anyway this morning.

Mr. PALASCHAK. I will offer one comment. You asked the question if there were savings associated with consistent funding. In the munitions business, there is savings because every time you cause a production line to go cold, you layoff workers or you shift workers to other areas. You have to lay away the equipment so that it is ready.

When you have a production break of that nature, it costs you money to bring the workers back, retrain them on the line, bring the equipment back out of lay away. There are significant savings associated with that. We have never been able to sustain that kind of funding within the munitions programs. I spent my career in ammunition production.

Mr. LONGLEY. Anyone else?

Mr. RABAUT. I would only like to make one comment about the chart and a prior comment that was made on the research and development line.

Let me frame it in this context. We are under great uncertainty. The reason it appears that there are so many mixed messages is that the definition of the legitimate and enduring national security needs, as Mr. Dellums mentioned, is in doubt. It is uncertain as to what that is.

We certainly do not want to fight the past war or prepare for the past war for the future. When we look at that chart, we certainly get upset with the roller coaster, but I would also mention that, that research and development line is the best in my opinion insurance policy that we could possibly have.

That it is not sufficient. The reason it is not sufficient is because our forces are going to be much smaller relative to other world forces in the future years. In fact, the Army I believe will be the eighth largest Army. You do not win wars with technology. You win them with great soldiers and great leaders.

These fellows here can tell you a lot better about that than I will ever be able to. I would offer to you, the way you leverage great soldiers and great leaders is through technology. To have the same level of technology in today's era as we did 35 years ago, when our intention is to leverage those great soldiers and leaders, I think really triggers a question in my mind.

Mr. HUNTER. Mr. Rabaut, you left out one thing and that is fielded technology leverages great soldiers and great leaders.

Mr. RABAUT. Certainly.

Mr. HUNTER. That moves the problem into the procurement area as well. As the gentleman mentioned, you fight with what you have when the flag goes up. Thank you. Mr. Hardison, go ahead.

Mr. HARDISON. I do not know that it will be any more true if I say it again. The thought that occurs is that in the small arms industrial base in particular, if you would change the way you buy repair parts and change where you do overhauls and do that at the companies that are capable of producing arms in the long-run, you

could keep alive a production capability without spending more money than you are going to spend not doing it.

So, there are changes in the way you do business that would meet your goal of preserving some capability that would not add to the cost as much as you might think, at least in the small arms business.

Mr. HUNTER. Has the Army ignored that recommendation from your perspective?

Mr. HARDISON. Sir, I will ask you to ask the Army about that. I did a study for them a year ago. They have taken it. I will let them answer what they have done with it.

Mr. HUNTER. Well, that is the last study you will have to do. Thank you. I want to thank the Gentleman from Maine for his extensive question. We appreciate his background and his service to the country that is behind that question. Mr. Tanner.

Mr. TANNER. Thank you, Mr. Chairman. I want to thank the panel, add my thanks to the panel. It has been an excellent morning. I will be brief.

I will ironically follow right up on what we have been discussing by asking Mr. Hardison, and perhaps General Hartzog if he cares to, about the small arms industrial base and about the fact that recently we have seen trends in the defense industry in general with regard to consolidation, merger, downsizing and the like.

Does the Army have any planned activities toward any sort of consolidation of the small arms industrial base that you know about to try to maybe maximize some of the economies of scale that we have seen in other parts of the defense procurement area?

Mr. HARDISON. Sir, I would have to punt. I would have to pass that to the Army.

Mr. HARTZOG. Sir, let me just tell you what the record shows occurred after the recommendations of the Science Board were made. I was not there at the time, so I am reporting that. Some things were done as a result of the Science Board's recommendations. Others were not for certain reasons. I will give you the reasons.

The Army did concur with the recommendation to pass about 80 percent of the available research and development funds to industry for developments. We award close to that 80 percent now. There were several other recommendations that were not accepted.

First, was the recommendation to transfer all of the small arms maintenance work from the depots to industry. That was felt at the time not to have taken into account the studies that were focused on the sizing of the DOD organic depot capabilities. That was one of the problems concerned.

Second, there was a recommendation to ship procurement of spare parts from small business to systems houses. That seemed to the decision-makers at the time to shift one problem or solve one problem or perhaps create or exacerbate another.

Finally, the overall pace of the buy was an affordability issue, given the TOA. The other modernization priorities and initiatives took better priority.

As to the current plan to consolidate, I will have to get that for you for the record, sir. I do not know.

Mr. TANNER. Thank you, General. Let me ask you this. What would be the Army's position in response to an industry initiative of consolidation in this area? Could you answer that?

General HARTZOG. I am sure only, sir, that it would get a responsible examination. I cannot forecast the answer to that without looking at some of the specifics of it.

Mr. TANNER. Let me ask it another way. Would there be any Army limitations in this regard to an industrial initiative to try to merge, downsize, consolidate to do things better?

General HARTZOG. Sir, it does not seem to me, as someone not terribly skilled in that part of the work, to have a lot of problems with it. I am not skilled in that part of it. I would rather get to someone who is, if I may, sir.

Mr. TANNER. Well, if I could follow further, and I do intend to be brief. I guess Mr. Hardison, did you all identify some outdated, restrictive, burdensome specifications and so forth related to some small arms as we have seen in other areas of the Pentagon's way of doing business? Have they been identified and passed on to the Army?

You mentioned awhile ago that the way we did things was important maybe as what we did.

Mr. HARDISON. We did not look into the military specifications aspect in any depth, if that is what you have in mind, sir. The two that seemed by far the more highly leveraged were the two that I have already mentioned.

The matter of source of repair parts procurement and the overhaul. If you do not change that, then you have missed the two substantial opportunities. If you do it, then you get about all you can get.

On the question of merging, again, that is an Army issue. During the course of the study, I was informed by persons from the Army at that time that the Army was trying to do all that it could to encourage that, on the grounds that it knew that it would not have enough resources to keep the current base, which is over facilitized, anywhere near occupied. So, it was hoping that would not happen in industry at that time. I would not imagine that would have changed.

Mr. TANNER. Thank you. General, do you have any follow-up to that?

General HARTZOG. No, sir, I do not. I would prefer to just run it down with the people who run it and provide it for you, sir, if I might.

Mr. TANNER. Thank you. One other question very briefly, if I might, Mr. Chairman. That is to Mr. Hardison and maybe Mr. Hartzog. We talked about some shortages in the ammunition that you all have talked about earlier.

Do you have any recommendations, I guess this would be a proper question, as to what types of ammunition you would add to the procurement budget were you to have that opportunity this year?

Mr. PALASCHAK. Yes, sir. In my testimony I mentioned that one of the things that the task force is doing right now is analyzing the budget to see which product lines are not supported.

At the same time, we did an analysis last year to identify some of the readiness requirements that we saw within the Armed

Forces. We will have a second increment which will identify things that we believe are appropriate for the services. Those will be provided to each of the four services before we submit it so it will have their grading on it.

Mr. TANNER. Will that be relatively soon?

Mr. PALASCHAK. We expect to have that completed inside of 2 weeks. We have the short list developed already. We simply have to do the necessary grading of it to make sure that we have not put something in there inadvertently that is supported in some other area.

Mr. TANNER. Thank you very much. I appreciate again all of the panel members. I wanted to ask about the small arms business, but all of you have done an excellent job this morning. I appreciate you. Thank you, Mr. Chairman.

Mr. HUNTER. Thank you, Mr. Tanner. Mr. McHale is next.

Let me just mention though when Mr. McHale finishes his questions we have a few other members who said they wanted to come back and ask a question, but we are going to take, in light of your great service in this maritime session, marathon session and maritime session, we are going to take a 5-minute break.

We will let you take a little rest here and then we will finish up with a few questions. The Chair has a few more questions. I think the ranking member of the full committee may have a few more questions. We may have a couple of other members who wanted to come in and ask their questions.

Mr. McHale is recognized and then we will take a 5-minute break.

Mr. MCHALE. Thank you, Mr. Chairman. Mr. Chairman, I want to echo the comments of my colleagues in terms of the quality of this hearing. I do not imagine we could have had a better qualified panel than that which has appeared in front of us today to present testimony on these issues.

My questions are going to be for General Wilhelm, mostly because I like his haircut, but for some other reasons as well. I am going to hear about that one later from Colonel Sadler.

Fifty years ago today, literally at the moment that we now speak. Fifty years ago today, Marines were still fighting for the seizure of Iwo Jima. If my memory serves me correctly, at one point there were 27 infantry battalions on the attack; 7,000 Marines gave their lives.

Applying the tactics of the day the Marines essentially, and in my view with extraordinary courage, attacked into the enemy's guns. Beginning about 15 years ago, the Marine Corps began pioneering concepts of maneuver warfare. There were articles published in the Marine Corps Gazette.

I think all of the services now recognize the validity of those theories. General, my question to you is, in that context of maneuver warfare where we mass fire power in a way that attacks the enemy's weak point rather than moving into the enemy guns, a proposition that I think on the modern battlefield is difficult to defend these days, what is the importance of the over the horizon assault?

What kind of equipment is needed and why is it needed to conduct an over the horizon assault? I read your testimony a few min-

utes ago. You placed an emphasis on the AAAV. If you could talk about the AAAV, compare it to the P–7 and the C–7, now utilized by the Marine Corps.

Weave in, if you would, the V–22 and the importance of the LCAC as already possessed by the Marine Corps. I guess in summary, my son tells me that when he grows up he is going to be a U.S. Marine. He tells me he is going to be a pilot.

I am still working on that. He tells me he is going to be a U.S. Marine. That would make him a second lieutenant about 10 years from now. What kind of gear do you need to acquire so that he and his fellow Marines a decade from now need not attack into the enemy's guns?

General. WILHELM. Thank you very much. Mr. McHale, first, on your son, sir, wanting to be a Marine and a pilot; one out of two isn't bad.

OK, sir, your first question is an involved one. Of course it really gets down to the fundamental issue of maneuver warfare versus attrition warfare. Probably one of the hardest things that I have to live down in this town is the water color by Charlie Waterhouse which depicts the landing on Tarawa in 1943.

Whenever I try to talk about amphibious power projection or projecting the power of this country from the sea, the first image that seems to get conjured up is Charlie Waterhouse's painting. Of course, I look at the mothers and fathers of young men and women serving in the Armed Forces and they say, never again, to which I reply, amen.

That is really what operation maneuver from the sea and over the horizon operations are all about; never again, no more Tarowas; no more Iwo Jimas; no more Mount Surabachis.

In those days, it was frontal warfare. It was very linear; strength against strength. He who had the most fire power, he who had the most men, he who had the most will and the most staying power won. We manufactured an incredible number of American heros in those days.

I think we have people today with the same amount of will and staying power, but that is not a responsible way to spend our most precious capital which are the lives of our young men and women.

Examine the merits of an over the horizon assault. What does that really do for you? The first thing that it probably saves are those amphibious ships that we talked about before. The very notion of bringing an amphibious ship, a large deck ship, in within 3,000 to 4,000 meters of a beach to launch our current vintage assault amphibian vehicle to me is out of the question.

Just think of the threats that are even imposed now by even Third World Nations with the proliferation of sea-skimming surface-to-surface missiles. Certainly, a very large and lucrative target and a chance that we cannot afford to take.

Enter the advanced assault amphibian vehicle; speeds of 20 to 25 knots. Those are the threshold and objective speeds that we list in its key performance parameters. We really visualize an assault starting from about 25 miles beyond visual target range.

Not only does that give us the element of surprise, also it provides increased queuing time for those shipboard defense systems to protect the platform against the very kind of shore threats that

I talked about. The MV–22, the Osprey, is a handmaiden to that. In this power projection operation from the sea, and I am not even going to call it an amphibious assault. This amphibious power projection operation from the sea, the Osprey, would probably launch from about 50 miles off on either an LHA or an LHD, closing on the beach at 250 knots.

It will still get to its deep in-land landing zones far faster than the current system, the CH–46, with a much higher probability of survival. I am sure General Loh would testify to this, but the old adage of the fighter pilot, speed is life, also applies to helicopter pilots and it also applies to the operators of surface vehicles.

We have mentioned the advanced assault amphibian vehicle coming from 25 miles offshore. We have mentioned the Osprey coming from 50 miles offshore. The next and the third and final leg in this tactical mobility triad, that is required to make operational maneuver from the sea a reality, we already have, thanks largely to the Congress and that is the LCAC, the landing craft air cushion.

A vehicle which I will tell you quite frankly has exceeded my wildest expectations. When I first saw it I was really impressed with its speed and its maneuverability. I said, those sailors will never be able to maintain that thing and keep it up. I was wrong. It is a reliable, incredibly flexible vehicle that will bring 75 tons of tank ashore for you at about 50 miles an hour.

It can launch anywhere from 25 to 50 miles offshore from whatever weld deck we want to bring it in. This then brings us to another point that I would like to just hit briefly.

The whole subject of mines and mine counter measures was front page news during Desert Shield, Desert Storm, when we really did not have the wherewithal to contend with the Iraqi mine threat off the cost of both Kuwait and the southern portion of Iraq.

We have done a lot to address those deficiencies. I guess really that is an answer to another question. We have a ways to go, but I see a point of light at the end of the tunnel. I think it is something other than the oncoming train. I think there are some solutions out there to the mine problem.

One of the best things to do with maritime mines is to avoid them. When you have systems like our current assault amphibian vehicle coming toward the beach at 5 to 8 knots, you do not have any opportunity to laterally offset and go around hazards, obstacles or mines.

That is another capacity that it gives us; the ability to alter our plan en route to the beach. I think if you put all of these things together, you see this remarkable gain in capability and flexibility that we are going to get through the fielding of these new systems which are partly a product of the imagination of American industry, our technological know-how and the support of our Congress.

Mr. McHale. Mr. Chairman, that was a superb answer. In light of the quality of that answer, it is going to be hard for folks to believe that we did not coordinate the question and the answer.

That really was an excellent summary of what the Marine Corps' portion of the battlefield will look like perhaps a decade from now. I thank the general. I thank the chairman. If nothing else, I know when to be quiet.

Mr. HUNTER. Thank you, Mr. McHale. General, we are going to finish. Batting cleanup is our great top gun from San Diego, the only Navy ace from Viet Nam, Duke Cunningham.

Before he asks his question, though, I just have to ask you. Mr. Deutch has slipped the AAAV. What affect will that have on your making the from the sea maneuver strategy ready to go?

General WILHELM. Sir, you are obviously aware, we did lose $190 million in that program in PDM–4. The end result of that was that it stretched our program out for 2 more years. Instead of achieving an initial operational capability in 2006, it will now be 2008.

Of course, time, circumstance and resources permitting, there is nothing we would like better to do than to shorten that program up. I think we have an excellent program that could shorten it as much as about 42 months and save us about $700 million, if in fact the resources were to become available.

Mr. MCHALE. Mr. Chairman, if I may. I apologize.

Mr. Chairman, if I may just very briefly on that point. General, for those of us who have difficulty converting knots to miles per hour, if my memory is correct, just to draw this very brief comparison, the AAV, the P–7 which is now in operation and has been in operation for decades, moves toward the beach if I recall correctly at about 6 miles per hour.

The AAAV, as I understand it, would ultimately have the capability to move a similar payload, we are talking about young Marines, packs and rifles to the shore at a rate of speed of about 40 miles per hour; a dramatic, breath-taking increase in the speed with which we move those forces to the shore and decreased vulnerability as a result of that speed. Is that approximately correct?

General WILHELM. I will tell you, Mr. McHale, everybody's math in this room is better than mine. That is what we have got lodged against our two contractors. It is the upper speed. I think that is around 30, 33 knots; about 33 knots. Again, if you really make that comparison 6 miles an hour versus 33 miles an hour; a remarkable gain.

Mr. MCHALE. Thank you, Mr. Chairman.

Mr. HUNTER. Thank you. Thank you, general. The top gun from San Diego, Mr. Cunningham, is recognized.

Mr. CUNNINGHAM. First of all, Mr. Chairman, there were two fighter aces in Viet Nam; Steve Richie was the Air Force ace and I was the only Navy ace.

Mr. HUNTER. That is the first time I have every heard you mention his name.

Mr. CUNNINGHAM. Steve who? Let me switch gears just a little bit to a question that I do not think has been asked or an area that has not been generated and something that I feel is very important, not only to procurement, but to readiness as well.

Let me make a statement first. I support, and probably one of the best committees I served on was Merchant Marine and Fisheries, and the bipartisan support of our maritime industry.

Now, I wanted to tell the gentlemen involved in that area that we have a panel which the chairman is a member of. It is very bipartisan in making sure that those needs are fulfilled, not only for commercial, but for military as well in redevelopment and establishing our maritime power in this country.

Second, is that the V–22 that you were talking about, and Mr. McHale is a charger for you. He comes up and lobbies daily, general, for you in keeping me informed. I want to salute the gentleman. Just in Government accounting, knots to miles per hour, add 15 percent and it is close enough to what that speed is. We have to deal with it every day.

My question is more when Captain Frank Alt did his study back in the late 1960s on why the Air Force, the Navy, the Marine Corps was not effective in air-to-air combat, there were a lot of recommendations that came out of that. One of those was that we establish adversary squadrons and establish the Navy Fighter Weapons School which is called Top Gun.

Top Gun, as you are aware, is loosing its F–16s which is the best simulator we have today for mig 29, mig 31 and in the future, mig 35. I think that if you take a look—our F–14 force moving to the East Coast, that our adversary of flying F–18 and the Marine Corps against F–18 is going right back to pre-Viet Nam to where we have similar aircraft fighting each other.

The adversary squadrons are being dismantled. Top Gun is losing and will get F–18's to fight against fleet F–18's. What I would like to see, of course, is more joint service. We cannot do it all of the time with the Air Force like we have tried to for years to fight F–18 against F–16 and so on.

What is the future of the adversary programs in both the Air Force and the Navy? The second question I have is that I look at F–22 and it is going to cruise around at about 1.4 mac. In that same vein, we train fighter pilots in the Phantom prior to Viet Nam as interceptor pilots.

That is why we fared so poorly in the beginning of that war. In Desert Storm, we had pretty good training programs. The Air Force, during that time, refused to fight dissimilar during the fight. Then after the war, they established very good adversary programs. With the F–22, what do you foresee to train these kids so that they are not just interceptor pilots with an airplane that flies very high, very fast, does have the capability of maneuverability low, but the training?

Last, looking at the research and development history of AFX, A–12 and so on, JAST has been delayed so far back. Are we going to be able, even if Ronald Reagan were reincarnated as President, to build back up to even the Bottom-Up Review with our inventory going out so fast?

As I understand it, that JAST is supposed to be a subsonic or barely a supersonic aircraft. The Navy is going to have an F–18EF that you can kick its rear end today with an F–14 or an F–15. That concerns me. I would have General Loh to start off, if you would.

General LOH. I would be happy to try and answer those three questions, Mr. Cunningham.

Mr. CUNNINGHAM. First the adversary question.

General LOH. We have been very successful with our adversary programs because we have been able to train, as you well know, those pilots to act like our adversary pilots and to conduct tactics in various types of aircraft; F–16, T–38, F–18 to emulate the tactics and the procedures of potential enemy pilots as well as the——

Mr. CUNNINGHAM. Soviet pilots.

General LOH. Or pilots of Soviet client states, former Soviet client states and so forth, like we would have fought against in any major regional conflict. They were very successful.

We have been forced to reduce the scope of the adversary programs in the Air Force and in the Navy because we just cannot afford the luxury of having an additional set of aircraft out there that are not a part of the combat force structure of our forces.

We have retained a small number at Nellis Air Force Base that are participating in Red Flag, that we continue to employ and that go around and train our own pilots against potential adversary threats. So, we have not lost the expertise there completely. It has been down-scoped tremendously.

Mr. CUNNINGHAM. Let me interject one thing, general.

General LOH. Yes.

Mr. CUNNINGHAM. Prior to the adversary squadrons, both the Navy and the Air Force had a 1-to-1 kill ratio. After those adversaries, we had a 12-to-1 kill ratio. So, when we talk about effectiveness in the future, I think it is very important.

General LOH. Part of the change in that effectiveness was attributable to adversary squadrons, but that was not the only reason why the ratio went up significantly.

Today, what we are trying to do to compensate is to do more dissimilar aircraft, air combat maneuvering. I would invite you, and if you were to come down to the Tidewater area, you would see daily flights flown this afternoon, tomorrow of our Air Force fighters, Marine fighters. There are pilots in the Marine Corps, incidently, and Navy fighters.

So, we have increased the TEMPO of those kinds of dissimilar aircraft maneuvers which helps, but does not solve that entire problem. So, that is a loss in some training capability.

Mr. CUNNINGHAM. Is there a plan to regenerate that in the future?

General LOH. Not at the present time because we cannot afford it. With regard to the F–22 and its envelope; the F–22 will have the capacity to cruise at supersonic speeds so that it can engage and disengage more efficiently without having to use after-burner and without having a high IR signature that that after-burner would produce. There is a tremendous survivability benefit to being able to cruise at supersonic speeds.

It also has a large subsonic, transsonic and supersonic envelope. We can train across a wide medium of airspeeds and altitudes with other fighters of the day like current F–15's, F–18's, or F–14's. It will not be restricted in this training because it can fly at supersonic speeds efficiently.

Finally, with regard to the JAST, the Joint Advanced Strike Technology Program, I agree with you completely. In my opinion, there are only going to be two major fighter development programs for the next 30, 40, 50 years. It is F–22 and the products that it derives and it is the JAST Program that are derived out of JAST.

We have got to satisfy all of the Nation's needs for fighters out of those two programs. That is why I have promoted it.

Mr. CUNNINGHAM. Do you believe it has got to be supersonic, JAST?

General LOH. Do I believe?

Mr. CUNNINGHAM. That the new JAST airplane has got to have a supersonic capability.

General LOH. No more so than current-generation fighters with regard to airspeed.

Mr. CUNNINGHAM. Yes, sir.

General LOH. It must be affordable. We must be able to buy them in quantity. It must have sufficient commonality of components that we can spinoff a replacement for the F–16 for the Air Force, an AV-Stovall aircraft for the Marine Corps, and perhaps a Navy aircraft if they seek a low-end affordable fighter.

We have got to focus on that JAST Program and get toward delivering operational prototypes and focus toward entering engineering manufacturing development soon, and defining the needs of the various services with regard to the products that come out of JAST.

We are doing that in the Air Force. JAST will be an F–16 replacement, just like the F–22 will be an F–15 replacement. We are, in the case of the F–22, seeking to find derivatives of that aircraft that would have more air-to-ground capabilities so that it can be used in more flexible and more versatile conditions and circumstances. Likewise, out of JAST, we need to develop the products that come out of JAST to satisfy all of the services and, in my opinion, provide the basis for an export fighter where we can delete the sensitive technologies and be competitive in the foreign market with an affordable multirole aircraft that would come out of the JAST Program.

Mr. CUNNINGHAM. If I may ask General Lopez on the adversary. Does the Navy have plans to increase its adversary training?

Admiral LOPEZ. Adversary squadrons are a problem for us. It is an affordability issue, sir. We have repeatedly discussed this with the CINC's. I think we have come to an equitable solution. We are going to have the Reserves. We want to keep that capability because we think it is very important.

The Reserves are going to pick up that capability. Admiral Hall believes he can do that full-op. We would still like to have it like we had it before. We just simply cannot afford it. I know even when I was in the 6th fleet, I was always looking for DACT to try and get the French or the Israelis or anybody to do DACT with us because it is very important. It is a perishable skill, adversary training or to train against an adversary.

I do not know how it is going to evolve. That is the direction we are taking now because that is what we can afford. With respect to JAST——

Mr. CUNNINGHAM. Does the Navy see JAST as a low-end aircraft?

Admiral LOPEZ. The Navy requires a high-end strike fighter that is first-day survivable; that is going to be stealthy; that is going to have a wide array of weapons; that is going to be day-night, all weather.

We need a platform that is going to replace our losses in the A–6; our losses if we could have built it in the A–12 and the GFX, et cetera. So, this is going to have to be a multimission aircraft for us. I realize that is not what the other two services are looking for, but that is what we need.

Mr. CUNNINGHAM. I would also like to see the V–22, one area that—I got in late—but it is not covered; just the capability of SAR, search and rescue, availability to get to a downed pilot quickly is lifesaving itself.

I would also like to look at the commercial utilization of V–22 as far as our DEA. I yield back the balance of my time, Mr. Chairman.

Mr. HUNTER. The gentleman's time has expired. Thank you, Mr. Cunningham and Mr. Dellums is recognized.

Mr. DELLUMS. Thank you very much, Mr. Chairman. Again, I compliment you on these hearings. I have tried to listen very carefully. I find them both intriguing and interesting.

They raised a number of extraordinarily important questions. Maybe an endless debate, but one that we have to grapple with because in the real world there are some pragmatic policy judgments we have to make; certainly with respect to the issue of industrial base.

If you look at it this way, and I am trying to state it as I have heard it this morning. If you size the industrial base, if your effort to size your industrial base, requires that you try to figure out that delicate balance among at least three elements, current needs and capabilities, future needs and capabilities, that is the next generation, and the third element, your capacity to ramp up in wartime, those are the three elements that go into how we size the industrial base.

Then I find General Wilhelm's comments extremely intriguing because in answer to the question, and General Wilhelm, you used your four B's: brief, brilliant, bloodless, and bargain. If that is indeed the reality, and I think we have to make some judgments about what we perceive as the reality-oriented scenarios and wars we are going to fight out there, then do you need to have a long-term World War II type industrial base ramp-up capacity if the general is correct that you are going to fight a 2-, 3-, 4-, 5-, or 6-month war?

Enormous implication for the nature of your industrial base. If you are arguing on the one hand that you need a long-term World War II, 2-, 3-, 4-year ramp-up capability, it flies in the face of the reality of the professional soldier who is saying, that is not the war that I see out there in the future.

So then that becomes, in my opinion, an interesting disconnect. Do you size your military for peacetime and size your industrial base for long-term war scenarios? Or do you size your military to meet the threats, fight the wars, and address the scenarios that you see in reality-oriented terms?

On that basis, do you size your industrial base to meet that reality? If you do, then it seems to me that a peacetime ramp-up is much more likely and much more where we need to go than a long-term wartime, World War II type ramp-up capability, which I think has enormous capability, Mr. Chairman, for the industrial base.

Where those realities are, where that balance is, I am not suggesting to you that I know. God does not speak to me alone. It seems to me that all of us have to use our intellectual capability to try to come to terms with that.

Again, as I said, if the general is right, and Mr. Chairman, it seems to me that the basis of your strategy on these hearings is to hear from the military personnel. Now, you have done that since the year began in order to ascertain from them what you perceive to be their correct judgments about the needs and the world they perceive.

If we are to take that at face value, I think that has implications for the industrial base that we are talking about here. Again, and I reiterate and I summarize very quickly. How do you address current needs and capabilities in the industrial base? How do you then develop the capacity for the next generation of needs and capacity? If you put too much emphasis on current and not enough emphasis on future, how do you ever get to the future capabilities? That is an important question.

Third, the ramp-up issue. Are you ramping up for a long-term war? Are you ramping up for the four B's. If you are ramping up for the four B's, that industrial base, it seems to me, takes on a different color, a different complexion, a different size. It has different implications.

I think at least as I have sat here today, Mr. Chairman, and listened to all of our distinguished witnesses, these are the things that jump out at me. I do not suggest to you that at the end of the day I have the answer. But at least it seems to me that that frames the nature of the discussion as we go forward.

With those observations, I would yield back the balance of my time.

Mr. ENGLAND. Mr. Dellums.

Mr. DELLUMS. Yes, sir.

Mr. ENGLAND. I believe you are absolutely right. This subject has been studied some. I will just say that I believe the answer to that is that the defense industrial base has to be integrated into the basic economic system and not be a stand alone industrial base. It does so that you can draw upon the entire resources of the country and not just firms dedicated to defense. They have to be broader in scope and in capability than just defense.

Mr. DELLUMS. Thank you, sir.

Mr. HUNTER. Thank you. Mr. Dellums, thank you for your very thoughtful comments. I want to thank all of the members. We lied about the break. It did not occur. Thank you for hanging in there with us.

Mr. England, let me ask you one last question before we wind up and go. You mentioned that we did need to have a sustained low-rate production of fighter aircraft. General Loh concurred with you on that.

My question is, what is that? Does the present budget manifest a sufficient rate to maintain the industrial base for fighter aircraft?

Mr. ENGLAND. Today, there are no fighter airplanes in the budget for the U.S. Air Force period. There is just none in the budget. There is none, except for F–22, you know, in the out years, but today—in fiscal year 1995 it was zero. It still is. As far as I know it will stay that way until F–22 comes on-line.

As General Loh said, he would like to. What I would also endorse is to maintain production of the current fighters. In the case of the F–15, the F–16 and he mentioned——

Mr. HUNTER. At what rate per fighter?

Mr. ENGLAND. OK. He was saying 100 or so a year. I said about 24 a year. Pardon me, 100 or so, which is about 20 or 24 airplanes a year. I do not know what was said, general, on your F–15's.

Mr. HUNTER. So, you are talking about per fighter class, 24 or so per year.

Mr. ENGLAND. It depends on the airplane.

Mr. HUNTER. The F–16.

Mr. ENGLAND. In the F–16, about 24 a year, yes, sir.

Mr. HUNTER. That is what you would like to see, OK. I just wanted to clarify that.

Gentlemen, you have proven to be a very knowledgeable and talented group. I want to thank both our uniformed guests and our industry guests for your input. This is a very serious business. The survival of our country is dependent on some of the decisions we make, and the survival of our people in uniform.

Thank you for your dedication. Mr. England, congratulations on a wonderful career. We know you will continue to serve.

Mr. ENGLAND. You bet. Thank you, sir.

Mr. HUNTER. General Loh, also thank you for everything you have done for the country. We wish you were going to be around for many more bomber studies to come, believe me.

Thank you, gentlemen. The committee is adjourned.

[Whereupon, at 1:33 p.m. the hearing recessed.]

[The following questions were submitted for the record:]

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March 31, 1995

The Honorable Duncan Hunter
Chairman, Military Procurement Committee
Committee on National Security
US. House of Representatives
Washington, D.C. 20515-6035

Modernization and the Defense Industrial Base

Dear Mr. Hunter:

Pursuant to your request in your letter dated March 15, 1995, I am writing to provide responses to the additional questions submitted by you and Congressman Ortiz for your consideration in connection with the fiscal year 1996 defense budget request.

As the Society indicated in its written and verbal testimony presented at the March 7, 1995 hearings, continued investment in helicopter production and research and development programs is required in order to maintain a US industrial base capable of meeting future national security requirements in a timely and cost-effective manner. With the industry's leading military helicopter programs, e.g., the Bell AH-1W and OH-58D; the Sikorsky UH-60L, SH-60B and CH53E; the McDonnell Douglas AH-64A; and the Boeing CH-47D, all of whose funding will end during the 1996-1997 period, the US industry will become wholly dependent on international military sales in order to maintain its key production lines. International competitors, meanwhile, are bringing new advanced helicopter systems to the market in quick succession, including the EH-101, the NH-90, the Tiger, and the Mi-38. By comparison, the US industry has only a single production program, the V-22, during this period. If US manufacturers are to remain competitive in international markets, therefore, the US government and industry must make substantial additional investments in next-generation technologies, processes and systems significantly above and beyond what is now planned.

Question 1. What is the impact of shutting down the only helicopter program in production? Currently, there are several helicopter programs in production, including the UH-60L (funds requested in the FY96 budget); AH-1W (funded in FY95); OH-58D (funded in FY95); AH64 (funded in FY95; but funding for FY96

currently rescinded); and the CH-47D (funded in 1995). The V-22 Osprey has been approved for production, and the RAH-66 Comanche, while not funded for production, has been funded for DemVal at the $2.1 billion level during the next five years. The AH64D Apache Longbow, which is funded in FY96 and the POM, represents an upgrade to existing AH-64 airframes. In addition, there are several commercial production lines, including the MD500 and Explorer series; the Sikorsky S-76 and S-70; the Bell 206, 230/430, 212, and 412 production efforts. With the exception of the V-22 and Apache Longbow, however, all of the US military production programs are not funded beyond the 1996-1997 time frame. These programs must be considered in connection with the US rotorcraft industrial base.

Question 2. With no foreseeable new helicopter production except for the V-22 tiltrotor, will the industry be able to ramp up to the bow wave of new production, upgrades, and service life extension programs anticipated 10 to 15 years from now? Without a continuing base of existing military production (AH-1W, UH-60, OH-58D, CH-47D, AH-64, RAH-66, V-22, and the like), the industry could experience significant delays as well as potential cost increases in any future ramp up for new production, upgrades and service life extension programs. Production of advanced helicopters at an affordable level is essential for the US industry to retain defense industrial expertise and mobilization/surge capabilities to meet national security requirements.

Question 3. What vendor base components are jeopardized by the cessation of new helicopter production? The gear manufacturing industry, which is highly dependent on helicopter production, would probably lose one or more of the current limited supplier base. The forging press capability within the US, highly dependent on fighter aircraft and helicopter production, is already severely compromised. Additional areas that might be impacted would be aerospace forging and composite industries which produce specialty materials such as steels and composites that are primary to the helicopter industry, as well as dynamic component grade titanium and aircraft bolts and fasteners manufacturers. Some suppliers are sufficiently diversified between military and commercial products that any impact would be limited to start-up delays in the event of new production starts. In all events, the loss of production business would limit prime contractors' leverage with these suppliers to invest in further advancements and development in their expert areas. The loss of this leverage could potentially impact system performance and technological competitive advantages.

Question 4. What is the outlook for foreign military sales and commercial sales in the near term? What happens if the international market does not materialize? (Congressman Ortiz asks a related question, what impact does

foreign military sales have on the ability to preserve the industrial base and keep important skills and production lines available?) Forecasts for international military sales by US manufacturers (both FMS and direct sales) vary substantially, and experienced industry analysts question whether such sales will approach half of the $900 million annual level predicted by DOD in its forecast (***World-Wide Conventional Arms Trade: A Forecast and Analysis***, DOD, December, 1994) . Civil helicopter sales have been flat in recent years, down from their resource development-driven sales highs in the early 1980s. Slow growth in civil sales of about four to five percent per year (in dollar terms) are forecast over the next ten years. However, civil sales, predominantly light helicopter production, have approximated only 20 percent of market value, and cannot offset industrial capacity or key technologies for military advantage.

International military sales are expected to average more than 20 percent of the average US sales revenue for the next ten years. This is an extremely important component of the US defense industrial base, in particular since the major US helicopter production lines which have sustained the US industry in recent years are now ending. Consider that between 1996 and 1997, the OH-58D (Kiowa Warrior) and AH-1W (Supercobra), CH47D (Advanced Chinook), AH64 (Apache), CH53 (Sea Stallion), UH-60L (Black Hawk) and SH-60B (Seahawk) current funding is projected to end. Only international military sales or continued US military procurement will sustain these important production lines. The continued health of the US industrial base depends to a considerable extent on industry's success in international military sales.

Continued success in international markets cannot be assumed. European helicopter manufacturers are now focusing political capital to enhance overall competitive advantage in foreign procurements. European countries, all members of the EEC, are driven to purchase only European products. Accordingly, it is imperative that the US have a policy framework that ensures the maximum "leveling of the playing field." Congress, the US Department of State, DOD and other government agencies must provide expeditious, pragmatic review of such barriers as technology transfer and geographic limitations, R&D recoupment, licensing and aircraft leasing limitations and the like.

Question 5. Is the DOD's decision to forego production of the Comanche an attempt to force consolidation of the industry? The rotorcraft industry will assess consolidation options and timing in light of business objectives, strategic positioning, and restructuring strategies relative to private sector performance measures and total customer requirements, not on a single program's year-to-year uncertainty.

The Honorable Duncan Hunter
March 31, 1995
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Question 6. Is the Longbow modification program sufficient workload to preserve the Apache industrial base? The Apache Longbow program is a modification program. Accordingly, the work content on Apache Longbow aircraft is substantially less than complete production needed to sustain the industrial base. MDHS expects to maintain core Apache production capability. The most significant industrial base problem will occur at the subcontractor level, e.g., the airframe producer. The Apache is predominately a "purchased parts" aircraft, and the survival of key subcontractors is at risk without new production.

Question 7. What is the impact on the industry if DOD sells or transfers thousands of surplus military helicopters on the open market? The impact on the US rotorcraft industry would be severe since the planned disposition of thousands of surplus aircraft by the Army will clearly displace sales in the 1996-2000 period of helicopters, helicopter engines and spare parts in FMS, public service and commercial and international markets. In addition, the disposition of surplus aircraft will raise major product liability issues. Helicopter manufacturers are key to the maintenance of an industrial base that is capable of meeting future national security requirements in a timely and cost-effective manner. Their weakening would diminish the industry's ability to meet future defense needs.

Question 8. Can the industry survive without US military helicopter production? Without US military helicopter production, the US rotorcraft industry cannot retain the total know-how or technical edge to respond to changes in the uncertain global national security environment. IR&D and civil production programs are not sufficient to maintain this real world defense competitive advantage.

On behalf of the US rotorcraft industry, the American Helicopter Society thanks you and the members of your committee for the opportunity to respond to your questions regarding modernization and the current state of the rotorcraft industrial base. Should you or your fellow members or staff members have further questions, please do not hesitate to contact me.

Very truly yours,

M.E. Rhett Flater
Executive Director

United Defense
FMC/BMY

April 10, 1995

The Honorable Duncan Hunter
Chairman, Subcommittee on Military Procurement
Committee on National Security
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman,

It was a pleasure for me to appear before the House National Security Committee on Tuesday, March 7, 1995, to testify on the Weapons and Tracked Combat Vehicles industrial base.

As requested, enclosed are answers to the questions submitted to me for the record. I have included the input received from General Dynamics Land Systems.

Sincerely,

Thomas W. Rabaut
President and Chief Executive Officer

United Defense LP World Headquarters
1525 Wilson Boulevard Suite 700 Arlington Virginia 22209-2411 Telephone 703 312 6100

QUESTIONS FOR MR. RABAUT

Questions from Congressman Hunter

Question: The Army has indicated that its FY 96 budget request supports the upgrade of 100 M1A2 tanks rather than the 120 tanks per year that industry says is a minimum sustaining rate. The Army projects that this level may drop to 80 tanks per year in the future. How important is it to achieve a rate of 120 upgraded tanks annually? How much is required to reach this rate?

<u>We received the following response from General Dynamics:</u>

It is extremely important that the rate of upgraded tank reaches 120 annually! First, the critical need for upgrades is to address the threat posed by foreign tank producers building tanks with increased protection and lethality for forces potentially hostile to the U.S. Second, it is not just the contractor who is saying 120 per year. The Army is very desirous of having more than 120 tanks modernized per year in order to ensure the ready to fight and win capabilities of the first to fight units who on deployment could be facing superior threat tanks. The Army reduced tank funding in a programming phase of budget building last summer in order to pay for near term readiness. So it is a matter of affordability and not a lessening of the critical need for these upgrades.

The M1A2 not only solves a key need for deploying tank forces but also is the key to the vision of a digital battlefield and the demonstrated benefits of digitization. The M1A2 is the centerpiece of the digital battlefield and is the only system designed to survive enemy direct fire from large caliber weapons and continue its mission of providing mobile protected fire power.

A five year multiyear contract for 120 upgrades per year is the minimum necessary to do four things:

- allow for forward pricing in a fixed price environment, where the cost of the tank is guaranteed to the Army;
- support future foreign sale opportunities by maintaining tank production at an affordable cost;
- retain the design team in the tank base to provide future tanks;
- avoid severe attrition in the vendor base, who, upon survey, indicate that a third will drop out of the market at less than 120 upgrades per year.

Funding for the five-year multiyear at 120 tanks per year from FY 96 to FY 01 is $3,747B. This is a six year period with the net effect of the multiyear being the execution of the multiyear in a timely fashion that will allow FY 96 to become the

beginning of the multiyear contract (one plus five). Funding in the President's Budget for this same six year period is $3,366B for a shortfall of $381M.

The Army and its contractor have identified savings of $142M so far. Use of the multiyear contract form in itself saves 7% from the cost of an annualized contract. This would make the shortfall $239M.

Two Congressionally authorized programs could create the next two increments of funding for the upgrade program. These are the use of $47M for upgrades from the sales of excess M60 tanks to foreign government. And secondly, the funding of the second year of the program to equip the USMC Reserves with M1A1 tanks and in return paying the Army $110M for upgrades.

With these two funding sources added to the current FY 96 President's Budget and the $30M the Program Executive Officer (PEO) believes will be the additional savings, the Army would only have to find $52M in its programming deliberation to stabilize the tank program at 120 tanks per year in a multiyear contract.

A multiyear is very desirable since it helps provide the best value to the customer by reducing unit price and stabilizing the critical vendor base while allowing the Army to modernize and field units with a reasonable and affordable program.

Question: What are your views on upgrade programs and production rates for the Bradley Fighting Vehicle, the M109-series self-propelled howitzer, and the M113-series armored personnel carrier? Are these systems being upgraded at less than the optimum rates? If so, what penalties or additional costs are incurred by the government and by industry?

Mr. Rabaut: There are no new Bradley Fighting Vehicles, M109 Howitzers or M113 series vehicles being produced and none programmed. Each of these combat systems is currently being upgraded to improve their capabilities and extend their useful life. We prefer to focus more on meeting Army requirements than on seeking business to preserve an oversized industrial base.

Because our segment of the tracked combat vehicle industrial base includes multiple platforms such as the BFVs, the M113 family, M109 Howitzer, M881RV, M9ACE, Breacher, and the Armored Gun System, we are not totally dependent on the upgrade rate of any single system. Our ability to control costs and provide affordable upgrades depends more on the total number of vehicles processed, irrespective of vehicle type, than on a fixed number of a single type of vehicle during the same period.

This flexible capability is a direct result of actions we took starting several years ago in recognition of where our segment of the defense market was headed -- down. To achieve this affordable, flexible operation we

- eliminated excess capacity and overhead to make our price structure more competitive at a reduced business volume;

- adopted a flexible manufacturing philosophy featuring stall built process as opposed to long production lines;

- combined the FMC and HARSCO defense business in United Defense LP to reduce duplication and cut costs;

- continued to invest in all advanced technologies that we envisioned would be required to extend the useful life of our current products;

- established strategic alliances with our vendors and the Army's depot system to make best use of both public and private facilities; and

- reduced our vendor base from 2,000 to 800 suppliers, resulting in better performance at lower cost.

In summary, we have evolved from an operation dependent on an optimum rate for a single tracked vehicle to one where optimum rate consists of the total number of systems and total workload being produced or upgraded irrespective of the number of different types of vehicles. However, an increased quantity of any given vehicle is welcome, anytime, and will have the advantage of reducing prices, sometimes on several different programs. Having said all that, we do have one vehicle upgrade program, the M881RV, which is currently funded at a very uneconomic production rate. We and the Army are seeking additional funding to remedy this problem.

In addition, the currently programmed purchase of M109A6 Paladins provides only two battalions for the Army National Guard, which now contains over 65% of the total Army's artillery (17 artillery brigades -- ARNG; 7 artillery brigades -- active Army). ARNG artillery deployed and fought well in Desert Storm. They will be an even larger part of the fire support element in the next conflict. It is essential their cannon artillery units be modernized on a priority basis. This can best be done by taking advantage of price options in the current Paladin contract, which will require additional funding in the FY 96 budget. These and other proposals are summarized on the next page:

SYSTEM	CURRENT PB (Qty/SM)	CHANGE (Qty/SM)	RATIONALE
M88	9/$23.6M	+16/$32.5M	Increase fielding rate of improved recovery vehicle for M1A2 tanks.
M113A3	240 est/$48.1M	+300/$50M	Accelerate modernization/upgrade
FAASV	-0-	+35/$32M	Match number of FAASVs to number of M109A6s in services; replace losses.
M9 ACE	-0-	+66/$60M	Fill Army requirement;
Paladin	205/$220.2M	+50/$55M	Funding for National Guard Requirements

Note: All these systems are real requirements. This is not an industrial base maintenance recommendation.

Question: In general, the use of multiyear contracts for acquisition programs can provide more stable funding to industry and result in a lower unit price to the government. What impact could the award of a multiyear contract have on the cost of the M1A2 program and the ability of the Army and industry to achieve a higher annual production rate with the dollars available to the program? Are there other programs in which the use of multiyear contracts might be advantageous to the government and to the tracked vehicle industry?

Mr. Rabaut: Multiyear contracts provide an excellent opportunity for the government to save money and we don't think this government should be hung up on the magical 10% saving threshold. The stability provided by a multiyear provides the foundation for a productive team partnership composed of those essential to a program's success -- the government program manager, the TRADOC systems manager, the test community, the industry prime contractor and his subcontractors.

Our on-going Breacher and Armored Gun Systems (AGS) are excellent new production programs that should be candidates for multiyear contracts. Not only would a multiyear save the government money in the production phase, it would facilitate the development of manufacturing processes and procedures and the necessary long-term integrated logistics support package in time to smooth the transition into production. In addition, the on-going M88 and Paladin production programs are also excellent candidates for multiyear procurement.

One caution -- since the tracked combat vehicle budget is at an all time low and projected to remain at that level over the next several years, any multiyear that commits a major portion of that budget to a single program potentially places the remainder of the industrial base at risk. A down swing in the tracked vehicle budget coupled with a guaranteed contract to any single system would deny the Army an opportunity to keep any or all other system upgrades funded.

We also believe that consideration should be given to fashioning a multiyear contract encompassing a number of our programs produced at a common facility which could give the government the flexibility to select the mix of vehicles each year, as long as a minimum program level is maintained.

<u>We received the following response to this question from General Dynamics:</u>

The implementation of a five year, multiyear contract for the Abrams Program provides the following benefits:

- Army gets a needed and predictable fielding plan at the 120/year rate
- It modernizes the "first to fight" units 2 1/2 years earlier than presently planned
- It provides a unit cost savings of 6-8%

- The vendor base remains intact with a stable, consistent volume
- Critical manufacturing capabilities are maintained
- It supports USMC-R-M1A1 requirements
- Future foreign sales opportunities are enhanced
- The entire tank industrial base is stabilized

Question: To what degree does production for foreign military sales contribute to the tracked vehicle industry's ability to sustain a warm production base, or to achieve optimum production rates? What is the foreign sales outlook?

Mr. Rabaut: Foreign military sales continue to be an important source of production to keep the U.S. industrial base warm and to optimize production rates. Equally important, low density systems such as the Armored Gun System will be significantly more affordable to the Army if we are successful in selling the system internationally.

As a defense contractor, we feel a strong obligation to the Army and our stockholders to market our products internationally and are continuously engaged in this effort.

These sales translate into reduced cost of product and do help preserve the industrial base for the Army. Contractors need strong support from the U.S. Government in order to meet foreign competition and have any chance of making major overseas sales.

However, we cannot base our tracked combat vehicle business on foreign sales. We have to organize ourselves so that a minimum acceptable full-service contractor capability survives, based on U.S. defense business. Any foreign sales we are fortunate enough to get serves to reduce prices to the U.S. government and maintain a stronger capability to meet defense requirements.

The prospects for combat vehicle foreign military sales can best be described as grim. In Europe a "buy Europe" approach has hurt U.S. sales as Norway filled their infantry fighting vehicle needs with a product from Sweden and Sweden and Spain filled their tank requirements with a German tank.

The Middle East market has dried up as low oil prices have hurt government cash flow.

The far east has been the only real bright spot as Japan, Singapore, Korea, Thailand and Taiwan have all shown interest in United Defense products.

The Pakistan and India markets have shown real interest in U.S. equipment but the Pressler Amendment denies U.S. manufacturers these opportunities.

We received the following response to this question from General Dynamics:

Foreign military sales of Abrams tanks and derivatives have been important in maintaining the tank industrial base and reducing the unit price for the U.S. Army. In 1990, General Dynamics was contracted by the Government of Egypt to provide 524 vehicle/vehicle sets of M1A1 components in a co-production agreement. Presently General Dynamics is in the 4th of 6 increments and is scheduled to complete the program early 1995. This contract took advantage of the ability to run M1A1 and M1A2 production concurrently and keep warm the capability to provide M1A1 unique spares for the U.S. Army at an affordable price.

The award of the contract from Saudi Arabia for 315 M1A2 tanks was critical in maintaining the tank industrial base. At the time the delivery of the last U.S. M1A2 (62 low-rate initial production M1A2s were authorized and funded) in April 1993, there was no further production planned except for M1A1 Egyptian kits. The Saudi contract kept alive the tank industrial base. It also facilitated the decision to execute the Abrams Upgrade Tank program by making the vehicles affordable and finally was a key factor in the decision by the State of Kuwait to buy 218 M1A2s. The synergy associated with leveraging research and development was also a benefit to the Army as its technology transferred to the next generation of M1-D2.

This has also helped maintain affordability and stability of the base. When FMS ends, a 120/five year multiyear is important to continue this stability.

Question: What is being done by industry to ensure that the subcontractor base for component manufacturers of the main battle tank and other tracked vehicles remains in place? What actions would you recommend that the government take to ensure the subcontractor base is maintained?

Mr. Rabaut: The subcontractor base for component manufacturers has been and will continue to be a major concern that must be addressed on a continuing basis. There are two categories of components that relate to combat vehicles.

1. Government Furnish Material (GFM) Components such as cannons, engine, transmission and a variety of fire control equipment. These comprise between 35% to 50% of the system cost. These are managed 100% by the Army.

2. All Other Components These components are procured by the prime contractor to support new production and upgrade programs and by the Army and Defense Logistics Agency to support fielded equipment. Procurements are not routinely coordinated between the government and the prime contractor.

As time progresses, more and more component manufacturers will cease production due to lack of funding. For components built by these manufacturers, the industrial base and field support will rely on overhauled items.

The long-term health of the base for non GFM components procured by both primes and the government, depends upon a coordinated procurement strategy. In our opinion, the industry prime should be the designated manager of the component base for each combat vehicle.

Concurrent with the breakback of components to the prime contractor, it will be necessary to place all system technical support (STS) with the prime to insure technical management of the component base. As components become obsolete or go out of production it will become necessary to reengineer/redesign components and make design adjustments to the vehicle system to accept the replacement component. Only the prime, who has the necessary engineering staff and a detailed knowledge of the vehicle system, can affordably perform this engineering function. This approach is key to tapping into the broader commercial base. The prime contractor, working with the Army, changes the specifications to commercial specs, redesigns only where necessary, and places the component manufacturing into the commercial base. The DoD cannot afford to support a dedicated military industrial base as in the past.

<u>We received the following response to this question from General Dynamics:</u>

The supplier base for the tank industrial base has been undergoing a consolidation over the past several years. As suppliers continue to exit the market, a conscious effort has been implemented to identify high-quality, financially secure vendors and direct additional business to them. This serves two purposes, (1) it assures the high-quality the Abrams tank deserves, and (2) the increased business base for the supplier makes all the components they provide more affordable.

As sound as this initiative has been, suppliers still continue to exit the market, either voluntarily or involuntarily. A recent survey indicates that at rates of less than 120 per year, 71% of the supplier base is at risk in terms of loss of critical skills, price increases or even market exit (28%). A 5-year multiyear contract at annual rates of 120 tanks per year will provide for the stabilization of the supplier base and minimize the erosion. Once again, our survey has concluded that 120 per year is the point of diminishing returns at which, below that level, risk and affordability is greatly increased.

Question: What are your views on the appropriate division of responsibility between government and industry for production, upgrade, and overhaul of tracked vehicles?

Mr. Rabaut: New production has and should continue to be produced by private industry.

There is no single formula that should be followed in determining the appropriate division of responsibility between government and industry for upgrade and overhaul of tracked vehicles.

While industry should have the major responsibility for upgrades, the M1A2 tank and the Paladin Howitzer are but two examples where private industry and the government can work as a team on selected upgrades. The guiding principal should be to hold the prime contractor responsible for the industrial base and system management. A smart prime with a long-term view of the defense market will work with the depot to the benefit of the total base.

DOD's policy that Depots should retain a core competency on designated systems is sound. High density, high use tracked vehicles that are critical to warfighters have sufficient numbers to assure a flow of overhaul work into the Depot and thereby provide a basis for the work force to maintain its competency. It is very doubtful that low density systems such as the Breacher and the Armored Gun System will return to depots in sufficient numbers to provide the amount of overhaul labor required to maintain competency. Other vehicle systems should probably be considered in this same category, such as M9ACE, M109/Paladin, and M992 FAASV. Long-term life cycle support for these systems should be provided by prime contractors. This support should include turnkey integrated logistics support to include configuration management, supply of parts peculiar, training, field contact team service, overhaul and upgrades.

Because of the prime's long-term commitment to the defense business, the Army can rely on affordable, responsive support without the need to establish and maintain a costly infrastructure.

<u>We received the following response to this question from General Dynamics:</u>

General Dynamics realizes that there now exists a large, post-cold war capacity in both the public and private sectors supporting diminishing volumes. We understand that government and industry must co-exist in this new environment and find ways to make the product affordable as declining defense budgets dictate. In addition, we believe it is important to sustain the critical, core competencies and the supplier base which supports them. A partnership between the public and private sectors on future vehicle upgrade programs is a way to take advantage of the unique capabilities of each sector. The teardown and overhaul capabilities of the public sector are joined with the design, engineering, manufacture and logistics support found in the private sector. The result is preservation of the tank industrial base at the most affordable cost.

Question: You state that, with careful management, the current combat vehicle budget and program, as you know it, **should support a viable business base with medium risk.** Yet, you ask the committee's help to insure the funding for tracked combat vehicle programs is adequate to: (1) preserve long-term readiness of the services by

supporting a reasonable rate of modernization: (2) preserve the tracked vehicle skill base needed for continual modernization and future program; and (3) insure that the programs support the services requirements for medium and heavy vehicles. Can you clarify these points for us?

Mr. Rabaut: In my 7 March statement before your committee I stated that,..."I can say unequivocally that the base today is positioned to serve our customers' currently stated needs." In order to sustain this capability and capacity a number of events or condition must occur each and every year:

- The combat vehicle budget and program must be supported at the present level or higher.

- Fund allocation between the tank base and the remainder of the tracked vehicle sector must remain constant. In this era, the tracked combat vehicle is a zero sum game. A plus-up of one program is at the expense of all others.

- Success in the international market must continue.

If past is prologue, the likelihood that all three of these events will happen every year in today's environment is in question. There is a definite risk that there will be insufficient budget and program in the Tracked Combat Vehicle sector to support a viable business base. This translates into a threat to the long-term readiness of the military services and the tracked combat vehicle fleet, i.e., medium risk.

Concerning your specific questions:

(1) As I stated in my 7 March statement before your committee "...the Services modernization budgets are woefully inadequate to meet the goals that they have set for themselves to transition to the 21st century. Examples include the 2,000 first generation Bradleys required, even for the significantly reduced Army that are technically unfit for combat. Even today armor units are without recovery vehicles that can handle the M1A1 tank." Additionally, our fighting force requires the remanufactured M1A2 tank and M109 Paladin Howitzer and the new production Armored Gun System and the mine field clearing Breacher system. These modernization programs will require the committee's continued support.

(2) The modernization programs mentioned above will not only insure the long-term readiness of the tracked combat vehicle fleet, they will also provide the resources to preserve industry's skill base. Preservation of the industrial base and its skilled work force is not a jobs program. Preservation of the base is a direct result of providing our fighting forces the modern equipment they need to fight and win a future conflict.

(3) Reference the response at paragraph (1), the Tracked Combat Vehicle budget and program are to support equipment and upgrades essential to the military's near-and long-term readiness. Support of the budget at the present or higher levels over the next several years is essential to providing our armed forces the modern equipment they require to fight and win battles in the future.

We received the following response to the question from General Dynamics:

One hundred and twenty (120) tanks a year in a five-year multiyear contract addresses all three issues for heavy vehicles.

Question from Congressman Ortiz:

Question: What impact does foreign military sales have on the ability to preserve the industrial base and keep important skill and production lines available?

Mr. Rabaut. Foreign military sales continue to be an important source of production to keep the U.S. industrial base warm and to optimize production rates. Equally important, low density systems such as the Armored Gun System will be significantly more affordable to the Army if we are successful in selling the system internationally.

As a defense contractor, we feel a strong obligation to the Army and our stockholders to market our products internationally and are continuously engaged in this effort.

These sales translate into reduced cost of product and do help preserve the industrial base for the Army. Contractors need strong support from the U.S. Government in order to meet foreign competition and have any chance of making major overseas sales.

However, we cannot base our tracked combat vehicle business on foreign sales. We have to organize ourselves so that a minimum acceptable full-service contractor capability survives, based on U.S. defense business. Any foreign sales we are fortunate enough to get serves to reduce prices to the U.S. government and maintain a stronger capability to meet defense requirements.

We received the following response from General Dynamics:

The impact of FMS on the tank program is significant because the only U.S. business foreseeable beyond the end of the century is Upgrade tanks at volumes of 120 per year or less and derivatives at even lower volumes. FMS agreements act to support critical manufacturing and the modernization of the U.S. Army forces. Therefore, additional skill are preserved through FMS. Also, the securing of FMS business keeps the per unit cost of all tanks at the most affordable level possible for the U.S. Upgrade tank and helps to offset severe reductions in RD&T and U.S. procurement accounts.

FIGHTER PROCUREMENT

UNCLASSIFIED

Congressman Hunter: Secretary Perry testified before our committee recently that the 100 fighter aircraft we are procuring each year are sufficient to support the 20 fighter wing bottom up review force structure. Unfortunately, as you and I know, instead of procuring the 100 aircraft Secretary Perry testified to, the Air Force isn't procuring ANY aircraft -- not last year, not this year, not next year. What will be the impact of the FYDP procurement plan on the 20 wing force structure? What procurement rate is actually required to sustain the 20 wing force, by aircraft type? What is the dollar shortfall to pay for that rate?

General Loh: At projected attrition rates, we will be able to sustain the 20 Fighter Wing Equivalent (FWE) force until fiscal year (FY) 00, after which attrition will reduce the force. Therefore, we need to buy about 24 F-15Es and 120 F-16s to sustain the 20FWE force level until we begin fielding the F-22 and JAST.

Air Force F-15E production could take advantage of concurrent production of F-15Es for foreign military sales during the FY96 to 98 time period. With this economy of production, the estimated costs, based on an initial procurement of 18 aircraft, is $55.8M per aircraft. Extending procurement for the Air Force beyond FY98 would help maintain the 20 FWE force, but the unit cost of the aircraft would increase significantly because coalition production ends in FY98.

In addition, to maintain the 20 FWE force and a healthy F-16 fleet, we will need 120 additional F-16 aircraft at a rate of 6 per year across the Future Years Defense Program (FYDP). In the out years, we would have to increase production to a higher level to complete the total buy. The cost of these additional F-16s is $1,054M across the FYDP.

STEALTH AIRCRAFT

UNCLASSIFIED

Congressman Hunter: General McPeak said the Air Force would never buy any new aircraft that wasn't stealthy. Is this still the case? Is that an affordable proposition?

General Loh: The Air Force sees stealth technology as essential to all of our future fighter, attack, and bomber aircraft; however, with normal attrition, we will fall below the 20 Fighter Wing equivalent (FWE) force structure required by the two MRC strategy before we can begin fielding the F-22 and follow-on stealth replacements for our F-16s. Therefore, we must buy some additional F-15Es and F-16s as an interim measure.

Our future stealth aircraft are affordable. We have a substantial investment in stealth and other leading edge technologies, and the F-22 and the aircraft that emerges from the Joint Advanced Strike Technology (JAST) program will leverage this investment. Not only will these new aircraft give us revolutionary operational capabilities, they will offer economies unmatched by our current aircraft. They will have the reliability and maintainability to deploy with less airlift

support; they will require fewer man-hours to maintain; they will require fewer support aircraft to perform their missions; and they will be more survivable than our non-stealthy aircraft. Taken together, these economies will reduce our long-term operating costs.

F-15E ATTRITION RESERVE

UNCLASSIFIED

Congressman Hunter: We understand that there is an unfunded requirement for additional F-15E attrition reserve aircraft. Given that attrition reserve aircraft were procured with the original F-15E buy, why are these aircraft required? Has the attrition rate been higher than forecast? Why do you need more F-15Es while at the same time you are retiring F-111s?

General Loh: The original buy of F-15Es ended at 200 aircraft for fiscal reasons although more were required to equip 2 full fighter wing equivalents as we had hoped to do.

The F-15E attrition rate has not been higher than forecasted. Rather, we did not buy enough F-15E attrition reserve aircraft initially to maintain the fleet as long as we now must.

The Air Force is retiring the F-111 primarily because of its high operating cost; this adds to our requirement for a robust F-15E fleet. With the retirement of the F-111, the F-15E will be our only long-range interdiction fighter.

F-16 ATTRITION RESERVE

UNCLASSIFIED

Congressman Hunter: We also understand there is an unfunded requirement for additional F-16 attrition reserve aircraft. Is this true and why are they needed? There are no aircraft requested for fiscal year 96 or 97. What is the annual procurement required to sustain the F-16 part of the Bottom Up Review's 20 tactical fighter wing force structure?

General Loh: The F-16 attrition reserve has been steadily depleted through normal attrition, the continued conversion of squadrons from older aircraft like the A-7 and F-111 to the F-16, and the retirement of many of our older F-16A and F-16B aircraft.

The Air Force expects to lose about 15 F-16s a year to attrition; therefore, to keep the F-16 fleet healthy and maintain the 20 FWE force until we begin fielding the F-22, we should buy at least 120 F-16s. Ideally, we would buy 6 aircraft each year, during the FYDP starting in FY96, to keep the production line open and avoid shutdown penalties. In the out years, we would have to increase production to a higher level to complete the total buy.

FIGHTER FORCE STRUCTURE

UNCLASSIFIED

Congressman Hunter: In your testimony, you indicated that the AF fighter/attack force structure has been reduced by over 50 percent. Would you please provide the details of this reduction, by aircraft type, and provide the plan for the FYDP, by aircraft type?

General Loh: A comparison of force structure in fiscal years 88, 95, and 97 illustrates the magnitude of fighter force reduction since the end of the Cold War. The 38.3 Fighter Wing Equivalent (FWE) force structure the Air Force had in FY88 is the high point. Today, in FY95, we stand at 21.45 FWE force structure -- a 44 percent reduction since the FY88 peak. We are programmed to draw down to a 20 FWE force structure by FY97 -- overall a 48 percent cut. The force structure is programmed to remain constant from FY97 through the FYDP (FY01). The following chart compares force structure by aircraft type in each of the above periods.
(Note: These are operational or combat aircraft and do not reflect the dedicated training, depot, test, attrition reserve and air defense aircraft.)

	FY88	FY95
F-4G	72	36
F-4	432	0
F-111	192	54
A-7	270	0
F-117	32	36
F-16	786	825
F-15E	0	138
F-15	504	312
A-10	468	144
TOTAL	2756	1545
	38.3 FWE	21.45 FWE

SEAD

UNCLASSIFIED

Congressman Hunter: We have concerns about where the services are headed in the "Suppression of Enemy Air Defense" mission. In Desert Storm, the coalition forces were highly dependent on EF-111s, EA-6Bs, F-4G aircraft for this purpose. Yet we see the services eliminating this crucial capability from their force structures. Is the Air Force planning to retire the EF-111 tactical electronic jamming aircraft? If so, are we to assume that future strike packages of AF aircraft will depend on stealth and standoff weapons to accomplish their mission? Or is the Air Force going to depend on the Navy's EA-6B to support its jamming requirements? Is the F-16 HARM Targeting System to be the replacement for the F-4G Wild Weasel? Are your suppression of enemy air defense requirements funded?

General Loh: Current Air Force plans call for EF-111 retirement in fiscal year 97. One proposed means to meet our stand-off jamming requirements is to use the Navy's EA-6B; however, the two Sevices have not yet determined a mutually acceptable concept of operations for use of the EA-6B, and no final decision has been made.

In my view, the EA-6B is not suitable replacement for the EF-111 in its present configuration. The EA-6B may require extensive and costly modification to give it the same capability we have now with the EF-111. Therefore, I believe it would be more cost effective to keep the EF-111 and continue upgrading it.

The F-16 with the HARM Targeting System (HTS) is our interim replacement for the F-4G in the reactive suppression role. The HTS pod for the F-16 is a low-cost, very effective system. HTS pods are now in the field and their support is funded. If the HTS is to be an adequate long-term replacement, however, it will require performance upgrades which are not currently funded.

In the long run, our goal is to reduce our defense suppression requirements by incorporating stealth into all of our future aircraft; however, it will be decades before we replace all of our current aircraft. In the meantime, our non-stealth aircraft will rely on defense suppression and standoff weapons to attack heavily defended targets.

RF-4 REPLACEMENT

UNCLASSIFIED

Congressman Hunter: Given that last year the Air Force stated that it did not intend to procure an RF-4 replacement, what has changed from last year for you to now be saying there is a requirement to replace the RF-4? Is this requirement funded? Why is the Air Guard evaluating a foreign reconnaissance pod for its F-16s? If the Air Force has changed its mind on manned tactical reconnaissance isn't the Marine Corps ATARS suitable for Air Force needs?

General Loh: For more than 15 years, the Air Force has sought to upgrade its manned tactical reconnaissance systems. This past year, however, the Air Force decided to retire the aging RF-4, and meet our reconnaissance requirements with a current generation fighter. Currently, the RF-4 replacement is unfunded. The Air National Guard, funded through a Foreign Comparative Test program, is the Air Force test agent for a Danish tactical reconnaissance pod which appears to be an affordable, low-risk alternative that is already in production. ATARS is another alternative, but it must pass an important development milestone before we can reasonably assess how well it could meet our requirements. We originally withdrew from ATARS because, in our view, it was too expensive and offered significant technical risk. If April's flight tests are successful, the Marine Corps will freeze ATARS' configuration, which should significantly reduce technical risk and provide a valid starting point to compare it with other alternatives.

FOREIGN MILITARY SALES

UNCLASSIFIED

Congressman Hunter: Does it concern you that over the next four years our fighter/attack aircraft industrial base will depend on foreign military sales for over 70 percent of its production?

General Loh: I believe that we must have a strong foreign military sales program for our fighter aircraft, but it must have as its foundation the development and production of fighters for our Air Force. Therefore, we must create the policy for an acquisition strategy that encourages sustained low rate production of our fighters and bombers for domestic use. I believe we can build fighters and bombers efficiently at low rates of production if we plan for it and reform our acquisition system. Then, we can add to this sustained production the foreign sales of export versions of our fighters. In this way we will not become dependent solely on foreign sales to maintain our military aircraft industrial base.

STRATEGIC MINERALS

UNCLASSIFIED

Congressman Hunter: In the past there was a concern that we were too dependent on foreign sources for strategic minerals as well as for critical electronic components of our aircraft. Is this no longer a concern? What has changed?

General Loh: I believe that we should remain self-sufficient in all components for our military systems. We should take the steps necessary to provide for competitive domestic sources for all components. We have for many years depended on foreign sources for some critical raw materials in our country. However, we must assure continued access to these materials through appropriate arrangements with foreign governments.

JAST

Unclassified

Congressman Hunter: Regarding JAST and ASTOVL, can you tell me what specific affordable Air Force, Navy, and Marine Corps requirement each of these aircraft is intended to meet? Please be specific with regard to range, payload, takeoff/landing distance, stealthiness and maneuverability relative to current Air Force and Navy aircraft.

General Loh: The JAST Program will address the fighter and attack aircraft needs of all three services. For the Air Force, JAST will supply an affordable multi-role replacement for the F-16. It is too early in the JAST program's development cycle to provide specific aircraft requirements and expected operational capabilities for each service. The JAST Program Integrated Product Teams of warfighters and technologists are using a disciplined strategy-to-task process and extensive modeling, simulation, and analysis to help the services develop these requirements.

UNCLASSIFIED

Congressman Hunter: JAST, to include ASTOVL, is intended to provide a next generation common, affordable aircraft for multi-service use. What common criteria, to include range, stealthiness, number of engines, number of cockpits, armament, and maneuverability have the three services agreed to for the next fighter/attack aircraft?

General Loh: Common weapons systems criteria have not been fully agreed to. However, JAST Program Integrated Product Teams are using a disciplined strategy-to-task process and modeling, simulation, and analysis to help the services develop specific criteria. General criteria include extended range without external fuel tanks, reduced signature, adequate agility and performance, and all-weather employment capability.

UNCLASSIFIED

Congressman Hunter: How many different aircraft types do you see evolving from the JAST-ASTOVL program? What affordability studies have been done relative to these programs?

General Loh: The Joint Advanced Strike Technology (JAST) program will produce a family of three primary aircraft variants. With the need to replace nearly 2,000 F-16s beyond the turn of the century, the Air Force has the dominant requirement for a JAST aircraft.

Boeing, McDonnell-Douglas, Northrop-Grumman, Lockheed, and Rockwell have all performed JAST affordability studies. These studies will continue in the concept development phase that began in December 1994. Aircraft commonality estimates vary between 70 and 90 percent with individual designs. Though the aircraft affordability is not fully quantified, this commonality should guarantee considerable cost savings over the life of the program.

SEAD

unclassified

Congressman Hunter: In the past, DOD has argued that the EF-111 and EA-6 aircraft were complementary, not redundant. What was the process by which it was determined that the EF-111 will be retired and the EA-6 retained? Since the EA-6 is limited with regard to speed, what aircraft will do escort jamming?

General Loh: The Air Force is planning to retire the EF-111 in FY97 in response to fiscal constraints in the DOD budget. To save money, OSD has encouraged the services to consolidate assets where possible to have a single system support all the services' requirements. Thus, we are considering replacing the EF-111 in the escort jamming role with the Navy's EA-6B. The final decision, however, has not been made.

In my view, the EA-6B is not a suitable substitute for the EF-111 in its present configuration. It may require extensive and costly modification to give it the same escort jamming capability we now have with the EF-111. Therefore, I believe it would be more cost effective to keep the EF-111 in the inventory and continue upgrading it.

JOINT STARS

UNCLASSIFIED

Congressman Everett: First, it is my understanding that NATO is considering the procurement of an air-to-ground surveillance system, and fashioning the acquisition and operation of this system similar to the current AWACS arrangement between the U.S. and

NATO. What is your view on JSTARS meeting this important requirement?

General Loh: Joint STARS is a quantum leap in surveillance technology and clearly the best solution to NATO's urgent ground surveillance requirement. Joint STARS would provide Alliance members with wide-area, high-volume ground surveillance data, while offering the best interoperability with other Alliance assets and infrastructures. It could also provide a robust command and control system to allow information collected by air-to-ground surveillance to be exploited quickly and effectively.

A NATO-owned, jointly-operated Joint STARS initiative would yield considerable advantages to the U.S.:

- Concurrent production and common support will generate savings for our own E-8 program. Life cycle costs will improve with increased production.

- A NATO Joint STARS could reduce operational requirements for the U.S. fleet in the same manner as the NATO AWACS. Given our world-wide commitments and anticipated high operations tempo, NATO Joint STARS will allow our Joint STARS to maintain a more manageable wartime and daily posture.

- We will get the most from our Research and Development funds by coordinating mutually beneficial R&D projects, similar to the current Electronic Support Measures and Radar System Improvement Program for NATO and U.S. AWACS.

TSSAM

UNCLASSIFIED

Congressman Everett: Secondly, I am concerned that our stand-off attack weapon capability is in a serious state with the cancellation of the TSSAM missile. I believe that you have stated that the HAVE NAP (AGM-142) can address this stand-off deficiency, yet the President's budget request for FY 96 contains no funding for this program. If you had additional funds, would you procure more AGM-142 missiles to provide this capability?

General Loh: The cancellation of the Tri-Service Standoff Attack Missile (TSSAM) program created a gap in our ability to attack high value, point, hardened targets from standoff ranges. We need to develop an affordable replacement for the TSSAM. In the interim, the AGM-142 (HAVE NAP) employed by our B-52s can provide a portion of that needed precision standoff capability.

C-130J

UNCLASSIFIED

Congressman Chambliss: It is fairly well accepted that one of the Air Force's primary requirements for the near and long term is airlift capability. Aside from even the most ambitious C-17 procurement schedule (which has yet to be determined), I would like your comments with regard to other elements of the airlift fleet. Specifically, the C-130J (the newest development to one of this country's most dependable military machine) is being developed by Lockheed as a commercial venture utilizing company funds. Do you

anticipate this program will satisfy Air Combat Command requirements and ultimately save the government money?

General Loh: The new C-130J will help us meet our theater lift requirements at a reduced cost. The need for reliable combat delivery aircraft is well recognized. On average, our active duty C-130s are 25 years old; they are becoming increasingly difficult to maintain, expensive to operate, and require extensive modifications and repairs to maintain operational capability and structural integrity. The C-130J will retain all of the capabilities of the current aircraft. We have also added to the C-130J proposal a modernized cargo handling system, better defensive systems, and an improved high speed airdrop capability to make the aircraft more survivable. Thus, we expect the C-130J to accomplish all the current C-130 combat delivery missions with improved reliability and reduced operating costs.

C-130J PROCUREMENT

unclassified

Congressman Chambliss: By way of follow up, the President's FY96 budget requests funds to procure 2 aircraft per year. At this rate, it will take over 60 years to replace the active duty C-130E fleet, or 8 years to modernize a single squadron. Is it correct to assume that ACC will increase the annual buy to a more economical and manageable quantity in future budget requests?

General Loh: In an unconstrained fiscal environment, ACC would increase the C-130J buy. This would allow us to replace our older C-130Es more quickly to avoid costly modifications and to reduce the cost of operating and maintaining the fleet. Current fiscal constraints and competing programs, however, force us to procure only two J-models a year through the FYDP.

MODERNIZATION

UNCLASSIFIED

Congressman Watts: In a recent Defense News article, Army Secretary West, said, "In this budget and budgets to come, modernization will continue to pay the readiness bill. Comments made today about the importance of maintaining our industrial base point to the need to insure we act today to protect the interests of those who will follow our military leaders into battle. Although each of our guests is qualified to offer testimony, you are distinctly qualified as one who commanded a research and development organization as well as a war-fighting command. If this Congress does not provide the necessary modernization of aircraft (both tactical and bomber forces), missiles (to include precision guided munitions), and space vehicles, what are the impacts to our industrial base and the ability to provide combat power?

General Loh: If we do not continue to fund modernization programs, the impact would be an ever shrinking defense industrial base and the loss of comparable combat capability as other nations improve their own forces. From a National Security standpoint, we lose twice: we lose the significant advantage we now have in combat capability; and we lose an economic struggle in military sales and

technology spin-offs to commercial industry. It is also important to keep in mind that we made force reductions in the 1990s based on our technological superiority; modest investments in today's modernization can maintain our superiority, which, in the long run, is cheaper than trying to regain it later.

LEASING

UNCLASSIFIED

Congressman Watts: General, as a businessman I've always been concerned about start-up costs, overhead, and other costs normally associated with doing business. My concern here is the issue of leasing. In a recent article in Aviation Week there was mention of the aerospace industry examining new ways to finance the Pentagon's purchases of transport aircraft, in particular a lease-to-buy that would defer up-front purchase costs for three years or more. It went on to say the Air Force was also interested in pursuing this as a procurement option. Please tell this committee how the lease vs. purchase option is looked-at when the Air Force is examining the procurement of a major weapons system? If lease vs. buy is not a normal part of the acquisition decision strategy, why not? And lastly, is leasing a system like a 747 or DC 10 truly a viable option that will reduce the initial costs to the American taxpayer?

General Loh: In most cases, the lease-to-buy option for procuring major weapons systems does not apply to the combat aircraft and munitions we use in Air Combat Command. There are very few civilian systems available that meet the operational requirements of our major combat weapon systems. Nevertheless, the Air Force is seeking out those commercial off-the-shelf systems and components that do meet our needs and we are considering a full spectrum of acquisition options.

JOINT STARS

UNCLASSIFIED

Congressman Dornan: I understand NATO is considering procuring an air-to-ground surveillance system and the acquired system is to be NATO owned and operated like our current arrangement with AWACS. I would like to get your perspective on the application of the Joint STARS to this requirement?

General Loh: Joint STARS is a quantum leap in surveillance technology and clearly the best solution to NATO's urgent ground surveillance requirement. Joint STARS would provide Alliance members with wide-area, high-volume ground surveillance data, while offering the best interoperability with other Alliance assets and infrastructures. It could also provide a robust command and control system to allow information collected by air-to-ground surveillance to be exploited quickly and effectively.

A NATO-owned, jointly-operated Joint STARS initiative would yield considerable advantages to the U.S.:

- Concurrent production and common support will generate savings for our own E-8 program. Life cycle costs will improve with increased production.

- A NATO Joint STARS could reduce operational requirements for the U.S. fleet in the same manner as the NATO AWACS. Given our world-wide commitments and anticipated high operations tempo, NATO Joint STARS will allow our Joint STARS to maintain a more manageable wartime and daily posture.

- We will get the most from our Research and Development funds by coordinating mutually beneficial R&D projects, similar to the current Electronic Support Measures and Radar System Improvement Program for NATO and U.S. AWACS.

UNCLASSIFIED

Congressman Dornan: I understand that you recently stated that the planned Joint STARS force structure of 20 aircraft should be increased to 40 or 50. Could you please explain the operational requirements which dictate this force structure increase.

General Loh: Based on the evolving world situation, if we had Joint STARS operational today, they would be in Korea, Saudi Arabia, Turkey, Bosnia, Central and South America, as well as being available for other contingencies. In addition, Joint STARS will be used for training, exercises, wargames, and testing very similar to the way AWACS is tasked today. At the present time, the Air Force is buying 20 E-8s and will complete the purchase in 2003. The fleet of 20 aircraft includes 17 operational aircraft, 2 for depot backup and 1 test aircraft.

Judging by our experience with AWACS, Joint STARS will also be a critical element in virtually every operation that the U.S. is engaged in. It will become one of our most dependable means of projecting presence and supporting our theater commanders when regional tensions arise. We originally sized our Joint STARS buy based upon cold war requirements, but like with AWACS, the new post-cold war peacetime environment has radically changed the conditions under which and how we will use the system. These peacetime requirements may quickly overtax the 20 Joint STARS we programmed to buy. In my opinion, we will need 40-50 JSTARS.

UNCLASSIFIED

General Loh: At projected attrition rates, we will be able to sustain the 20 Fighter Wing Equivalent (FWE) force until fiscal year (FY) 00, after which attrition will reduce the force at a rate of 16.5 aircraft per year. Therefore, we need to buy about 24 F-15Es and 120 F-16s to sustain the 20 FWE force level until we begin fielding the F-22.

Air Force F-15E production could take advantage of concurrent production of F-15Es for foreign military sales during the FY96 to 98 time period. With this economy of production, the estimated cost, based on an initial procurement of 18 aircraft, is $55.8M per aircraft. Extending procurement for the Air Force beyond FY98 would help maintain the 20 FWE force, but the unit cost of the aircraft would increase significantly because coalition production ends in FY98.

In addition, to maintain the 20 FWE force and a healthy F-16 fleet, we will need 120 additional F-16 aircraft at a rate of 6 per year across the Future Years Defense Program (FYDP). In the out years, we would have to increase production to a higher level to complete the total buy. The cost of these additional F-16s is $1,054M across the FYDP.

General Loh: The draw down of our fighter forces since the end of the Cold War permitted us to slow the average aging of our fleet. In the past seven years the overall fighter force has aged only two years due to the retirement of many of our older aircraft. Today, the average age of our fighter fleet is 10.6 years. In the next seven to ten years, however, the age of our fighter force should increase at a greater rate due to a lack of new aircraft entering the fleet. The average age of our fighter force will be 17 to 20 years old before we bring on the next generation fighters--the F-22 and JAST--in any appreciable numbers.

Questions for Record, 3/7/95 House National Security Committee hearing, responses by Duane D. Fitzgerald, Chairman of the American Shipbuilding Association.

Q1, Q6 and Q9. What is the industry's assessment to withstand a 10-year "drop-off" in naval shipbuilding? What will happen to vendor base during this period? Will some shipyards that build naval vessels simply not make it through this "down period?" What happens if the international market doesn't materialize?

A1, A6 and A9. The current US naval shipbuilding base for complex combatants and large amphibious and auxiliary ships, including strategic sealift ships - comprised of six major US building yards - will in all likelihood not withstand a five-year, let alone 10-year, "drop-off" in naval shipbuilding, unless a substantial and sustained volume of other shipbuilding work materializes in the intervening years. In the absence of meaningful changes in national policy, it looks unlikely that the volume of non-US Navy shipbuilding work required to help preserve the current base will develop in the critical next five years.

Only a few of the six major shipbuilders would remain, and those that do would likely be operating at less than optimal levels. The other yards will have closed, their unique capabilities and worker skills lost, and prospects for bringing them and their capabilities back almost nonexistent.

The vendor base specialized in, and dependent on, US Navy shipbuilding programs has, like the US shipbuilding industry, already experienced a significant decline. They will continue to disappear from the naval industrial base if unable to attract other customers and orders. Some are likely to leave the reduced-volume naval business by choice for more stable commercial business if they can develop that alternative.

At best, commercial shipbuilding can only partially replace reduced Navy volume. It can, however, be an important part of the industrial base solution and a key supplement to Navy workload. For the market to "materialize" for US builders, significant investment is required to compete in the world market. World capacity now exceeds demand by over 30%. Efficient world commercial shipbuilding capability exists after years of government-assisted capital investment and research and development support in Japan, Korea, and Western Europe. Without a strong government/industry shipbuilding strategy and policy, the international market will not materialize for US yards.

It is also important to recognize that the number of US shipbuilding yards able to construct ships more than 400 feet in length has already dropped by almost half since 1982 when there were 37 such facilities. The latest US Maritime Administration survey lists only 21. Only six of those yards are under contract to build large, complex ships for the US Navy. Together, these six yards represent over 95% of all US shipbuilding employment today.

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Force structure requirements and basic mathematics dictate an average annual procurement of at least 10 Navy ships to support and sustain the 346-ship Fleet endorsed in the Defense Bottom-Up Review. The current, proposed FY'96 Navy Shipbuilding Future Years Defense Plan averages 5.6 new construction starts per year including the strategic sealift program. If sustained, that procurement rate for Navy ships will result not in a 346-ship Fleet, but in a 196-ship Navy. The suituation confronting the Navy and its shipbuilders has worsened just since last year when the Navy's budget plan for FY'96 contained funding for five warships and two sealift ships. As presented, the FY'96 budget funds only three warships, for an industry-wide shipbuilding program of only five ships.

Q2. Is there an FMS market for combatant or sealift ships? Are there administrative impediments that prevent such sales?

A2. Foreign military sales are intensely competitive, and the naval market component is no exception. US naval shipbuilders build the world's most capable and sophisticated combatants and sealift ships. Few nations today seeking to acquire ships look to shipyards outside their borders to produce those ships, naval or commercial.

Countries looking to enhance their naval forces want to build ships in local shipyards and create the industrial infrastructure and jobs that go along with it. Most major US warships, because of their sophistication and size, are more advanced and require a larger complement of trained officers and crew than many smaller nations require or could support. Coast Guard-type coastal patrol craft probably represent the most commonly desired naval vessel.

The US Navy's strategic sealift ships are specifically designed to meet demanding, unique US military requirements shared by few other countries, including our European allies. Our allies do not have the extensive overseas commitments or forward deployed presence that we do. NATO and Asian countries have their own shipbuilding industries, and are unlikely to buy foreign-built (in this case, US) military ships, in large part because of the domestic backlash certain to result from any such decision.

This does not mean that there are no FMS opportunities for US naval shipbuilders. In fact, several of the major US yards have had international naval contracts. Some have involved US construction, but most have utilized US shipbuilder support for in-country production, mostly in areas of technical, material, systems and management support. There are international prospects for naval combatants and auxiliary ships, but the competition - particularly from the Europeans - is formidable. European governments seem willing to go to almost any length to secure FMS shipbuilding orders for their yards, including instances where other military equipment has been provided at little or no cost to sweeten the deal.

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When a major ship construction contract is competed by an allied Navy that requires the ability to finance a ship's construction over a period of years, US shipbuilders face a substantial disadvantage since our competitors have access to concessional government financing but the US government offers no similar support for export sales of US-manufactured defense systems. Despite Congressional enactment in FY'94 of a limited defense export loan guarantee program, the Administration failed to utilize that authority, and allowed it to lapse.

Another impediment to US shipbuilders having opportunities to construct naval vessels for other nations is the basically unavoidable result of the lease or transfer of older US naval combatants and auxiliaries to a number of friendly navies. As the US Navy Fleet retires whole classes of ships, this situation is likely to continue to postpone new construction FMS opportunities for which US shipbuilders can compete. Opportunities for US industry could be created, however, by tying the transfer of US naval vessels to US shipbuilder participation in new construction projects planned in recipient countries. There have been a number of situations where such an approach could have resulted in work for US industry. Current US policies on ship transfers should be examined to identify ways to connect them more directly with efforts to preserve the US shipbuilding industrial base.

Q3 and Q7. What steps is the industry taking to reduce the impact of decreased spending? Are the MARITECH and Title XI loan guarantee programs working and should they be continued?

A3 and A7. US shipbuilders have worked together the last several years to gain Congressional and Executive Branch support for the industry's efforts to reenter commercial markets and gain other supplemental work to partially offset the loss of Navy volume. The National Shipbuilding Initiative contained in the FY'94 National Defense Authorization Act represents a significant advance in establishing more effective national policy in this area. The enhanced Title XI commercial ship construction and shipyard modernization loan guarantees, and the MARITECH program for commercial shipbuilding technology, are important resources and help to position the industry for the commercial market.

They are both less than two years in existence, and should be continued. Unfortunately, just as these two programs are starting to bear fruit, the US signed an international commercial shipbuilding trade agreement that will severely restrict their future utility beginning January, 1996, particularly in regard to Title XI, despite the fact that same agreement allows existing foreign subsidy practices to continue for several years.

US shipbuilders are not solely looking to the government for solutions - but the government needs to play a vital supporting role. All six major US Navy shipbuilders have implemented aggressive cost-reduction programs and will strive to sustain Navy production efficiencies and hold down costs in the face of dramatically less work, particularly in the next five years.

Q4. What are the shipbuilders doing to reenter the commercial market?

A4. All five major surface shipbuilders have constructed various designs of commercial ships successfully before, but have been almost exclusively engaged for the last 10-15 years constructing today's superior US Navy Fleet. In the last several years, US yards have taken steps to form partnerships with ship operators and foreign commercial shipbuilding yards to understand the commercial ship market and acquire those business practices that can assist US yards as they seek to establish competitive commercial processes and gain construction contracts. US yards have devoted resources to developing and marketing modern commercial ship designs and construction plans.

Q5 and Q8. What are the major impediments to building commercial ships and what steps should the National Security Committee take to ease the transition. How does the Navy support efforts of its shipbuilders to rescquire commercial shipbuilding capability? Are there regulatory impediments that hinder production of navy and commercial vessels in the same facility?

A5 and A8. Major impediments to commercial shipbuilding do confront the Navy's shipbuilders. Commercial ships represent a very different challenge compared to warships. They are far less complex from both a design and construction standpoint. They involve significantly less labor content and will employ a narrower mix of trades than those required and developed for naval construction. Building a typical commercial ship heavily emphasizes structural (steel) trade work in relation to warship construction which emphasizes outfitting trade work more heavily.

US shipbuilders can and must become competitive in commercial markets to partially replace lost Navy volume. In addition, Naval shipbuilding efficiency can be improved through selective application of commercial practices. However, commercial shipbuilding alone can not sustain adequate employment or the skills, facilities and experience required to maintain national defense capability.

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Over the past 15 years, while foreign shipbuilders have been dominating the commercial market with the benefit of substantial government assistance, US shipbuilders have concentrated their talents on designing and constructing US Navy warships of increasing complexity. These circumstances have widened the commercial competitive gap between US and foreign shipyards. Because of substantial product differences, superior capability in Naval shipbuilding does not automatically prepare a shipyard to competitively enter the world commercial shipbuilding market.

Ideally, US shipbuilding facilities need to be configured to handle both Navy and commercial work with high efficiency, allowing flexibility to shift resources from one market to another as circumstances dictate.

The biggest impediments to gaining commercial orders confronting US naval shipbuilders are: lack of recent or current experience building commercial ships; the difficulty inherent constructing two very different products - one military and one commercial - at the same time without losing critical focus on Navy construction requirements and skills; and, the lack of US government support that is in any way comparable to the sustained, direct government support foreign shipbuilders have received after the unilateral US termination in 1981 of it's last direct commercial shipbuilding support program.

The National Security Committee is urged to continue to support and fund the Title XI and MARITECH requests, and to thoroughly scrutinize the OECD commercial shipbuilding trade agreement's impact on the defense shipbuilding industrial base. The negotiated agreement, in its signed form, is unfairly imbalanced against this vital US industry. Congress should insist that the negotiations be reopened and a more equitable Agreement forged.

The Navy needs to take a more visible, active role within DoD, the Executive Branch, and before the Congress, in promoting the need for more responsive policy action to assist critical Navy shipbuilders to reenter commercial markets so they can preserve their naval capabilities and skilled workforces.

The Navy should work to modify those business practices that inhibit its shipbuilders' ability to competitively pursue supplemental business opportunities and to attract necessary private capital for such ventures.

With the Navy's six major shipbuilders expressing unified concern over the OECD Agreement, Navy leaders should acknowledge the significant stake the Navy has in this issue.

The Navy should provide no further funds for the foreign acquisition of ships for the inactive Ready Reserve Force. Navy leaders, civilian and uniformed, must make the case for preserving its shipbuilding industrial base, and the severe national security risks if that objective is not secured.

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Q10. What specific recommendations are made to "increase navy shipbuilding accounts to meet and sustain current and projected force structure requirements" and "explore every alternative to avoid relying on a major ramp-up at the decade's end."

A10.
The number of new construction Navy ships funded in FY'96 and subsequent fiscal years must be increased. Doing so within current budget constraints will be a challenge, but every option for doing so must be explored. There are substantial outyear costs related to inefficient production rates in the proposed FY'96 FYDP shipbuilding profile which can be avoided by increasing, and then maintaining a more stable shipbuilding procurement plan in FY'96 and subsequent years.

Otherwise, the Navy is headed below 200-ships, based on severely depressed procurement plans and budgets. Congress, in its wisdom, must decide whether a US Navy Fleet of less than 200-ships adequately protects the security of this maritime nation.

MODERNIZATION (AVIATION) - SIX YEAR BUDGET

Mr. Hunter: What is the Army's current requirement for Apaches in the 10 active division Army? Is this requirement fully funded in the six-year budget? If not, why?

General Hartzog: I would like to address the Apache requirement from the perspective of the total force, which, as you know, encompasses 8 national guard and reserve divisions as well as the 10 active Army divisions.

The total force requirement is 987 Apaches. This requirement will equip all 29 heavy attack helicopter battalions and 2 Armored Cavalry Regiments. Additionally, this number provides the required Apaches to fill tables of distribution and allowances (TDA), operational readiness float (ORF), repair cycle float (RCF) and attrition accounts.

The current Army 6-year budget will equip all 15 active Apache battalions, the Active Armored Cavalry Regiment (3rd ACR), 2 USAR and 7 ARNG heavy attack helicopter battalions. The 6-year budget does not, however, fill the 278 Armored Cavalry Regiment (Army National Guard [ARNG]) and the five ARNG heavy attack battalions in Force Package 4. It is important to note that if funds were available to produce additional Apaches, those Apaches would be built as Longbow Apaches since the Apache modernization program begins production in FY96 with first unit equipped in FY97. Additionally, the Army needs to invest money into the Longbow program to increase its production rate to the original rate of 72 per year which will shorten the modernization period of the Apache fleet by 3-4 years.

MODERNIZATION (AVIATION) - ATTACK AND RECONNAISSANCE

Mr. Hunter: Are there enough Apaches to perform both the attack and reconnaissance missions in heavy divisions?

General Hartzog: The Army has enough Apaches for the active duty heavy attack helicopter requirement. However, there are not sufficient Apaches available to equip all the Army National Guard (ARNG) heavy attack battalions. In this area the Army has assumed risk by equipping these battalions with AH-1F Cobras until the RAH-66 displaces Apaches from the scout role in the active duty Apache battalions and cascades those Apaches to the ARNG Cobra equipped battalions. In the area of Reconnaissance the AH-64 is not a reconnaissance aircraft. The AH-64 is only used in the scout role (different from the reconnaissance role) in the heavy attack battalion because the Army does not have any other aircraft that can satisfy this requirement. The Apaches performing the scout role in the heavy attack battalion will be replaced by the RAH-66 in the future.

MODERNIZATION (AVIATION) - ARMED KIOWA WARRIOR

Mr. Hunter: What is the requirement for the OH-58D Armed Kiowa Warrior in the 10 active division Army? How has this requirement changed, considering the recent decision to cancel production of the Comanche?

General Hartzog: The Army requirement is 507 OH-58D Kiowa Warriors. The current Army Acquisition Objective is 382; however, attrition (16 aircraft) and decrements to the retrofit program in FY95 and 96 have left us with 356 OH-58D Kiowa Warrior aircraft and 10 OH-58D Army helicopter improvement programs (AHIP) that require retrofit. Retrofit funding will compete in the FY97-01 Mini-POM.

Fielding of these 366 aircraft allows us to upgrade active units plus the 1-185th Mississippi National Guard Target Acquisition and Reconnaissance Company (TARC). This leaves all Target Acquisition and Reconnaissance Platoons (TARPs) in the active and reserve component, two ARNG TARCs, and the ARNG 278th Armed Cavalry Regiment (ACR) (Enhanced Brigade) with non-modernized aircraft until fielding of the Comanche. The Comanche restructure does not change the requirement for 507 Kiowa Warriors.

The deferment of Comanche production prolongs our armed reconnaissance mission area deficiency, but does not increase or decrease the Kiowa Warrior requirement. The Kiowa Warrior is a near term interim solution to the deficiency in armed aerial reconnaissance. The Aviation Restructuring Initiative (ARI) objective force design includes the RAH-66 Comanche as the sole aerial reconnaissance helicopter. Until the Comanche is fielded, the less capable OH-58A/C, AH-1F Cobra, and the OH-58D Kiowa Warrior must continue to perform the aerial reconnaissance mission.

MODERNIZATION (AVIATION) - ENHANCED RESERVE BRIGADES

Mr. Hunter: Are there enough Apaches and Armed Kiowa Warriors to perform both the attack and reconnaissance missions in light and heavy divisions and in the enhanced reserve brigades?

General Hartzog: The Army has enough Apaches for the active duty heavy attack helicopter requirement. However, there are not sufficient Apaches available to equip all the Army National Guard (ARNG) heavy attack battalions. In this area the Army has assumed risk by equipping these battalions with AH-1F Cobras until the RAH-66 displaces Apaches from the scout role in the active duty Apache battalions and cascades those Apaches to the ARNG Cobra equipped battalions. In the area of Reconnaissance, the AH-64 is not a reconnaissance aircraft. The AH-64 is only used in the scout role (different from the reconnaissance role) in the heavy attack battalion because the Army does not have any other aircraft that can satisfy this requirement. The Army has sufficient Kiowa Warriors under our current strategy of fielding to equip only active cavalry squadrons and light attack battalions as an interim solution until Comanche production. Decrements have shorted us 10 retrofits which will compete in the FY97-01 Mini-POM and we would need at least 24 Kiowa Warriors to field the 278th ACR (Enhanced Brigade)

MODERNIZATION (AVIATION) - NIGHT AND ALL-WEATHER

Mr. Hunter: Is the Armed OH-58D capable of performing night and all-weather missions stated in Army's current requirement for armed reconnaissance? If not, then isn't there still a requirement for the Comanche?

General Hartzog: The OH-58D Kiowa Warrior is capable of day and limited night operations. The aircraft does not have an adverse weather capability. The Mast Mounted Sight System incorporates a low-light television, thermal imaging system (TIS), and laser rangefinder/designator which provide a night capability superior to the current OH-58A/C and AH-1F Cobra fleets. However, the OH-58D Kiowa Warrior does not have integrated night pilotage. Night pilotage is provided by night vision goggles that are limited by visibility, obscurants, ambient light, and compatibility with forward looking infrared (FLIR) pilotage systems on the AH-64 Apache.

Yes, there still is a requirement for the Comanche. Comanche conducts armed tactical reconnaissance to provide near real time battlefield information for the tactical Commander. Its mission, armed reconnaissance, entails determining where the enemy is and is not, the enemy's intent and capabilities, and maintaining contact, reporting and forcing the enemy to react before commitment of US forces. Comanche will: fight for information, preclude the enemy from gaining information on friendly forces (counter reconnaissance), provide real time interpretation of information, provide multiple spectrum onboard sensors to optimize information gathering under differing environmental and battlefield conditions, provide increased radius of action, and be responsive directly to the ground maneuver commander.

Studies and analysis, and lessons learned during the last fourteen years have examined numerous alternatives to the Comanche, to include a combination of national assets, Joint Surveillance Target Attack Radar System (J-STARS) and unmanned aerial vehicles (UAV) in addition to manned aircraft. All conclusions lead to the same conclusion: procure Comanche. Constrained resources have delayed Comanche fielding, but have not mitigated the warfighting requirement. The impact on the Army is:

(1) Delay solving Aviation's most critical warfighting deficiency--Armed reconnaissance and security.

(2) Retain deficient and obsolete aircraft in the inventory performing reconnaissance and security missions until at least FY 2010. (No rapid deployment capability, not survivable, limited high/hot capability, no night/adverse weather/battlefield obscurant fighting capability, and potential for fratricide not reduced).

(3) Fail to take advantage of leap-ahead technologies required to integrate the 21st Century joint digital battlefield to achieve modernization overmatch.

(4) Require additional resources to maintain tactically and technologically obsolete aircraft.

(5) Continue procurement and/or costly upgrades to the Apache and OH-58D. These aircraft are better than the obsolescent light fleet, however, they cannot fix all the current Cavalry deficiencies nor take Army aviation onto the digitized future battlefield in the armed reconnaissance mission area.

MODERNIZATION (AVIATION) - BLACK HAWKS

Mr. Hunter: Has the Army filled all of its requirement for medium lift Black Hawks? If not, what is the requirement? Is this requirement fully funded in the six-year budget? If not, why?

General Hartzog: No. The UH-60 Black Hawk Objective Requirement is 2126 aircraft. At the end of the current multiyear plan the Army will have procured 1450 UH-60 Black Hawks. Due to aircraft attrition and transfers, the Army will only have 1375 UH-60 Black Hawks on hand once all aircraft fieldings are complete. This represents an on hand balance of 65% of requirements. Three active component medical evacuation (MEDEVAC) companies which support Force Package 1 units are not projected to be modernized under current fielding plans. This translates to 27% of the MEDEVAC fleet projected to support Force Package 1 will be operating with obsolete, Vietnam era, UH-1V helicopters.. At the end of current production and fielding, the Total Army table of organization and equipment (TOE) Utility Fleet will only be 85% modernized, the total Army Utility MEDEVAC Fleet will only be 47% modernized, and the Total Army Sustainment Fleet (includes training base, maintenance floats, test aircraft, projected attrition, loan, lease, table of distribution and allowances (TDA), and general support non-TOE) will only be 36% modernized. The aircraft short fall of 676 (procured)/751 (on hand) has not been funded in the six-year budget due to higher aviation priorities and declining resources.

MODERNIZATION (AVIATION) - RESERVE AND NATIONAL GUARD HELICOPTERS

Mr. Hunter: What is the requirement for light utility helicopters in the Army and in the National Guard and Army Reserve? Is this requirement fully funded in the six-year budget? If not, why?

General Hartzog: The Total Army requirement for light utility helicopter (LUH) is 131 aircraft; 96 TOE plus 35 sustainment. The XVIII, III, and I Corps' are each authorized an LUH Battalion (ARNG structure) consisting of 32 aircraft for a total LUH table of organization and equipment (TOE) requirement of 96 aircraft. The LUH sustainment fleet requirement, which includes training base, maintenance floats, projected attrition, and TDA, is 35 aircraft. Congressionally directed studies of the Light Utility Helicopter (LUH), and the UH-1 Service Life Extension Program (SLEP) were completed by U.S. Army Training and Doctrine Command (TRADOC) and the U.S. Army Aviation Center in May 1994. The studies were subsequently approved at HQDA and forwarded to Congress in Jul. 94.

The studies recommended that if the UH-1 were used to fill the LUH role, then a minimum SLEP consisting of only avionics and wiring be considered for the 96 TOE and 35 float LUH aircraft. Currently a Mission Need Statement (MNS) for Light Utility Helicopter (LUH) capability is being staffed at HQDA. The UH-1 is one of nine potential materiel alternatives identified in the MNS. The UH-1H is currently the interim aircraft designated to fill the LUH requirement until a materiel solution is identified to fill that role. The LUH requirement is not funded in the six-year budget due to the fact that a materiel solution has not yet been identified.

MODERNIZATION (AVIATION) - AGING AIRFRAMES

Mr. Hunter: What is the Army's plan for retaining old OH-58A/Cs, AH-1s and UH-1s? How much will operations and support costs increase to maintain these aging airframes?

General Hartzog: The Modernization Strategy does not involve retention of UH-1s, OH-58s, and AH-1s. For example as we downsize and go to aviation restructure initiative (ARI) design and field OH-58Ds (Kiowa Warriors) and UH-60Ls, we will retire by the year 2000, approximately 3000 aircraft. When Comanche is fielded and there is resourcing of the UH-60 fleet, then we will retire the remainder of the OH-58, AH-1, and UH-1 fleet. To do anything less would have high cost in operational capability and O&M costs. Potential investment of additional dollars in the current fleet would cost $12-19 Billion dollars over a 20 year period.

TRACKED VEHICLES

Mr. Hunter: What is the Army's requirements for tracked vehicles? Specifically, what is the situation with respect to the M1 series tank, the Bradley Fighting Vehicle, the M113 - series armored personnel carrier, and the M109-series self-propelled howitzer?

General Hartzog: The M1 series Abrams tank requirement is 7686, Bradley requirement is 6994, M113 Family of Vehicles requirement is 17353, and M109 howitzer requirement is 2160. These requirements are based on the new 10 division force structure. All of these systems are no longer in production but each has an ongoing upgrade program for existing vehicles.

TRACKED VEHICLE REQUIREMENTS

Mr. Hunter: Are the Army's tracked vehicle requirements funded to procure new or upgraded tracked combat vehicles at optimum levels?

General Hartzog: No. Resource levels for all of our major tracked vehicle programs--- Abrams, Bradley, Armored Gun System, Command and Control Vehicle, Breacher, Heavy Assault Bridge, Improved Recovery Vehicle, M113 Family of vehicles-- are constrained by affordability considerations. It is a fact that this strategy stretches fieldings, causes increased costs, and applies pressure to the tracked vehicle industrial base. However, this strategy is the consequence of the tradeoffs made by the Army based on a severely constrained funding top line combined with high priority war fighting requirements that we must meet.

ARMORED FAMILY VEHICLES

Mr. Hunter: The Army's original plan for the Armored Family of Vehicles included a requirement for several different special purpose vehicles for command and control, breaching and bridging obstacles, and other purposes. We understand that the Army is experimenting with a prototype tracked command and control vehicle and a prototype tracked engineer support vehicle. How does the Army plan to meet its requirements for such special purpose vehicles and what is the status of these programs? Has the Army met its requirements for the Armored Combat Earthmover?

General Hartzog: We are developing a tracked command and control vehicle and two engineer mobility vehicles.

The Command and Control Vehicle (C2V) will provide commanders and battle staffs their first opportunity to execute command and control (C2) on the move. It will have mobility comparable to the Bradley. The key to the system, now in development, is the Vehicle Inter/Intra Communications System (VIICS) and the C2 module made up of the various components of the Army Tactical C2 system. This system will allow all members of the on-board battle staff vertical and horizontal connectivity to the "tactical internet," allowing them to communicate digitally, and by radio on the battlefield. The C2V will support up to eight satellite communications. The program is doing well. Two prototypes are undergoing testing now with two more scheduled for 4th Qtr, FY95 when government testing begins. The first unit will be equipped in FY99.

The first special purpose engineer mobility vehicle is the M1 Breacher, which will be known as the "Grizzly." The Breacher is built around an M1 chassis and is designed to clear complex obstacles for the mounted force. It will clear lanes 4 meters wide through minefields by plowing through at a depth of 15 inches; it can also clear debris from roads. It will have the same mobility and sustainability as the M1 tank. Two prototypes of this vehicle have been built and are undergoing contractor testing. Government testing will begin late in FY95 to support an FY96 Milestone II decision. The current plan is to equip the first unit into FY00.

The second special purpose engineer vehicle is the Heavy Assault Bridge, nicknamed the "Wolverine." The Wolverine will replace the Armored Vehicle Launched Bridge (AVLB) one-for-one. The Wolverine is built around the M1 chassis and carries an assault bridge that will cross a Class 70 load over a 24 meter gap. This increases the current Class 70 crossing capability by 60 percent. It will have the same mobility and sustainability as the M1 tank. The program is healthy and on track. Delivery of EMD prototypes is scheduled for FY96. The first unit will be equipped in FY99.

The Army has not met its requirement for the M9 Armored Combat Earthmover (M9ACE). The current Army requirement is nearly 1900 vehicles. We currently have 448, with the National Guard expecting delivery of an additional 34 in FY96. This will bring the Army up to 26% fill of the total requirement. There are no plans to buy additional M9 ACEs through the POM years. We will, however, spend over $38 million through FY02 to provide improvements to the current fleet; this will improve the capability of the ACE and will also improve its readiness rates. Following a research and development period, the next major procurement of the ACE will begin in FY07.

MODERNIZATION (FIRE SUPPORT)

Mr. Hunter: We note that the Army's plan for fielding of the Multiple Launch Rocket System falls short of the original plan for the replacing all M110A2 8-inch howitzers in both the active and reserve components with the MLRS, and that several reserve component battalions will continue to be equipped with the 8-inch. Why? What would the cost be and over what period would additional MLRS have to be procured in order to meet the Army's original plan to retire the obsolete 8-inch self-propelled howitzer?

General Hartzog: Launchers have been procured to complete fielding to all active units and eight National Guard Battalions. Reductions in the Army Total Obligation Authority resulted in the Army stopping procurement of MLRS launchers in Fiscal Year 1994. A total of six battalions (29 launchers per) and five divisional batteries (10 launchers per) would be required to equip all units. The cost would be $130.0 million (FY96 dollars) per battalion and two battalions could be fielded each year. The Army's current plan is to replace the remaining National Guard 8-inch units with modernized 155mm self-propelled howitzers.

AMMUNITION - AMMUNITION BUDGETS

Mr. Hunter: Are the services' ammunition budgets sufficiently funded to support all war reserve and training requirements for two major regional contingencies (MRC)? If not, why?

General Hartzog: The Army currently has sufficient war reserve to fight and win two nearly simultaneous major regional contingencies against current threats. Additionally, the Army's ammunition budget fully funds training in FY96, however, training is not fully funded FY97-01. The Army's ammunition Functional Area Assessment (FAA), which articulates ammunition and modernization funding goals, identifies a $1.8 billion dollar shortfall in training and war reserve funding over the period FY96-01.

AMMUNITION - WAR RESERVE STOCKS

Mr. Hunter: Under what conditions is it acceptable for ammunition war reserve stocks to drop below those levels needed to meet regional Commanders-in Chief (CINC) requirements?

General Hartzog: : Army deems it acceptable risk to maintain war reserve stocks under 100% required for limited items which are constantly in production, usually to support training, and for which the production base can adequately produce within 90 days. Examples are: small arms ammunition, selected types of smoke grenades and demolition items.

AMMUNITION - BELOW 100% ESSENTIAL

Mr. Hunter: How much below 100% are essential items allowed to drop? When is procurement funded to replace these war reserve stocks?

General Hartzog: As mentioned in question #14, the Army deems it acceptable risk to maintain war reserve stocks under 100% required for limited items which are constantly in production, usually to support training, and for which the production base can adequately produce within 90 days. Examples are: small arms ammunition, selected types of smoke grenades and demolition items. The Army does not let the war reserve stockpile drop below the capability to support one MRC.

AMMUNITION (ACCEPTABLE SUBSTITUTES)

Mr. Hunter: Do any of the theater CINCs acknowledge that they can accomplish their mission with the "sufficient acceptable substitutes" they will receive if they happen to be in command of forces fighting the second MRC?

General Hartzog: The Army currently has sufficient stock to fight and win two near simultaneous MRCs against current threats. The "sufficient acceptable substitutes" provides the CINCs with ammunition that will defeat the current threat. As modernization occurs these rounds will become available to the CINCs.

In a 2-day conference (31 Jan to 1 Feb) with the Chairman of the Joint Chiefs of Staff, the Joint Chiefs and the Commanders-in-Chief agreed that the force levels and other capabilities recommended as a result of the Bottom-up Review were sufficient to support the objectives assigned to the Armed Forces by the President's National Security Strategy, including execution of the two nearly-simultaneous major regional contingencies strategy, assuming that planned enhancements and Service modernization efforts materialize in a timely manner.

AMMUNITION - $2B ADD

Mr. Hunter: Did the Administration's $2-billion add to the FY 96 defense budget for fully funding training and readiness include funding for training ammunition?

General Hartzog: The FY96 Army ammunition budget provides the best balance of training and war reserve procurement consistent with Army priorities and available funds. It also addresses industrial base and demilitarization needs which are an important component of the total ammunition procurement picture. The FY96 budget: fully funds training ammunition; provides modest funds for war reserve modernization and production base support; and funds an aggressive demilitarization program.

SMALL ARMS REQUIREMENTS

Mr. Hunter: Are the services' small arms requirements currently met? If not, what are the shortfalls?

General Hartzog: The Army has not achieved its acquisition objectives for the M16A2 rifle, M4 carbine, M249 squad automatic weapon, or the MK 19-3 grenade machine gun. It is important to note that our requirements are in a state of flux as we continue to adjust our force structure. The acquisition objective consists of the total quantity of weapons required to equip active, National Guard, and Army Reserve units; additive operational projects; operational readiness floats; repair cycle floats; projected combat losses; and "compo 4", forces that do not exist today but might be required in a full mobilization.

Our ongoing Total Army Analysis (TAA 03) will identify necessary future adjustments to combat, combat support, and combat service support forces. We expect to complete this effort by September 1995. Additional adjustments may also be necessary as additive operational projects change and assumptions underpinning the calculation of combat loss rates are revisited. Until these efforts are completed we cannot definitively state our shortfalls.

FUTURE SMALL ARMS TECHNOLOGICAL ADVANTAGE

Mr. Hunter: Since the Army chose not to fund any of the 1994 Army Science Board recommendations for preserving critical elements of the small arms industrial base, what is your plan to ensure that US forces will continue to hold the technological advantage in small arms in the future?

General Hartzog: There are a number of areas where we can achieve significant capability improvements in existing small arms and we are pursuing these through several avenues. The soldier enhancement program or SEP is the path we are following to identify, develop, test, and field relatively simple improvements.

Some examples of these improvements are a blank firing adapter, collapsible buttstock, and an assault ammunition pack for the M249 squad automatic weapon; an improved spotting telescope, laser hardened optics, and a flash suppresser for the M24 sniper system; and a modification to the M4, M16, and M203 weapons which we term "modular weapon system" since they allow the soldier to attach various ancillary equipment such as advanced optics or night vision sights as different missions require.

We are pursuing improvements to the MK 19-3 grenade machine gun, including a soft mount and two system-specific training devices: a gunnery trainer and a tactical engagement simulator. These efforts will improve accuracy, shorten reaction times, and lower training costs through reduced ammunition consumption and barrel wear.

Additional areas of improvement such as small arms fire control, optics, and ammunition are under consideration but we have not found adequate funding to pursue them at this time. On the horizon is the objective family of weapons, an approach which will provide an individual combat weapon, a crew served weapon, and a personal defense weapon.

The approach examines all potentially relevant technologies, including new combinations of demonstrated technologies, combinations of existing and emerging technologies, or all-new technological approaches in pursuit of the joint goals for the objective family of weapons.

MODERNIZATION OF SMALL ARMS INVENTORY

Mr. Hunter: How does the US military plan to modernize the current inventory of roughly 2.3 million small arms, if there is no foreseeable procurement in the defense budget?

General Hartzog: We are in the process of developing procurement strategies that address our small arms modernization shortfall in Fiscal Years 97-01. However, small arms must compete with other Army programs for scarce modernization resources. Given this, we are working closely with industry to develop a workable solution which addresses Army shortfalls and complies with the Congressional direction in the FY95 Defense Authorization Act.

MODERNIZATION (EQUIPMENT REQUIREMENTS)

Mr. Hunter: The mission of the Army has changed significantly since the end of the Cold War. Has this changed the Army's priorities for combat, combat support, and service support equipment?

General Hartzog: The Army's mission remains to fight and win the nation's wars. For warfighting, the importance of combat and combat support equipment has not changed. However, the increased emphasis on operations other than war (OOTW) and other contingencies has strained our combat service support assets. We are looking at how to balance these priorities.

MOBILITY REQUIREMENTS

Mr. Hunter: The Chief of Staff of the Army (CSA), in responding to previous questions in testimony, stated he could use additional funding for mobility as one of his unfunded priorities. What are the Army's unfunded mobility requirements?

General Hartzog: The Army's mobility requirements fall into two major areas, both of which are of great concern. The first of these is tactical mobility, essentially trucks. We have a significant shortfall in our truck modernization efforts and the average age of our truck fleet is increasing rapidly. One of the immediate concerns in modernization is to upgrade that fleet, and it is a top priority. Specifically, we could use help in our Family of Medium Tactical Vehicle (FMTV), Family of Heavy Tactical Vehicle (FHTV) and High Mobility Multi-Purpose Wheeled Vehicle (HMMWV) programs. If we were given additional funds it would be one of the Army's early priorities to put part of those funds against each of these programs, in addition to putting some of it against other equally important short-term readiness needs. As more funds became available we would continue to invest in these programs in order to upgrade our truck fleet.

We also have a strategic mobility requirement. In this area, we are heavily dependent on airlift and sealift. While we are making good progress in concert with the other services in reaching the strategic lift capability recommended by the Mobility Requirements Study (MRS) we still are not there. The Army fully supports funding for the C-17 aircraft, the Roll-On/Roll-Off (RO/RO) ships and the Large Medium Speed RO/RO (LMSR) ships. Key to getting the forces to the port is the condition of the transportation infrastructure. We need continued funding of the transportation infrastructure improvement program.

ARMY TRUCK MODERNIZATION NEEDS

Mr. Hunter: "How would you prioritize the Army's truck modernization needs?"

General Hartzog: "I would prioritize the Army's truck modernization needs as medium fleet, light fleet and heavy fleet"

EXTENDED SERVICE PROGRAMS FOR TRUCK FLEETS

Mr. Hunter: "The Army is considering remanufacture or Extended Service Programs (ESP) for its light, medium, and heavy truck fleets. As you represent the Army's "User", the soldier, how will you ensure that the soldiers' requirements and needs are addressed and met? Specifically, will ESP programs be subjected to the same testing requirements as new trucks and does this include a requirement process, and operational as well as developmental testing?

General Hartzog: "As the Army's user, TRADOC has representatives at all reviews for type classification, procurement, development testing and fielding. System proponent representatives ensure that user requirements are met. System testing depends on the level of funding for that system. Obviously, the Army will perform sufficient testing to ensure that the vehicles are safe for soldiers to operate. While requirements documents, as such, are not used, we expect that agreements similar to that for the current 2-1/2 ton ESP program would be used for other ESP programs. Operational testing has not been performed on the current 2-1/2 ton ESP program, nor has it been performed on truck rebuy acquisition programs such as the M915A2 Line Haul Tractor and the M916A1 Engineer Tractor."

AVAILABILITY OF TRUCKS FOR EXTENDED SERVICE PROGRAM

Mr. Hunter: "It has been briefed to the Army leadership that you must induct three old trucks for every two you receive out of a remanufacture process. Does the Army have enough trucks available to do an Extended Service Program (ESP)?"

General Hartzog: "The 2-1/2 ton ESP program consumes trucks in the remanufacture process as you have indicated. However, remanufacture of newer or heavier trucks is not expected to consume assets at that rate. We would expect an almost one to one result for programs that would involve 5 ton and Heavy Expanded Mobility Tactical Trucks (HEMTT) programs.

The Army has sufficient assets to support the current 2-1/2 ton program. Support of other programs will count on the fielding of new vehicles to release assets for the remanufacture programs. In some cases, a portion of unit assets may have to be drawn down to support a remanufacture program in order to provide upgraded assets to the unit. The Army has sufficient assets to support ESP programs."

NEW TRUCK PROCUREMENT

Mr. Hunter: "What is your most immediate requirement for procurement of new trucks?"
General Hartzog: "Our most immediate requirement is for procurement of new 2-1/2 and 5 ton trucks, Heavy High Mobility Multipurpose Wheeled Vehicles, Heavy Expanded Mobility Tactical Truck wreckers and yard tractors."

ESP FOR NEW FAMILY OF MEDIUM TACTICAL VEHICLES

Mr. Hunter: "We spoke previously about extended service program (ESP) for light, medium, and heavy trucks. In the case of the medium fleet, will an ESP vehicle meet the requirements set forth for the new Family of Medium Tactical Vehicles? Can a commercial truck satisfy Army requirements for off-road mobility?"
General Hartzog: "The ESP vehicle will not provide the same level of performance set forth for the Family of Medium Tactical Vehicles. However, we have tried to obtain as much commonality as we could between the two. For example, the engine for both are the same basic design from the same manufacturer.

For the commercial truck to meet Army off-road mobility requirements, it would have to meet current Army operational requirements. The Family of Medium Vehicles procurement was conducted under provisions of free and open competition. If there were commercial manufacturers that believed they could have met Army requirements, they would have bid on the contract. While the Family of Medium Tactical Vehicles is not a commercially available truck, I would point out that it is an assembly of commercially available companies."

HYDRA 70 ROCKETS

Mr. Hunter: We understand the Hydra-70 rocket was recently grounded due to safety considerations. What is the status of that deficiency? What is the projected cost to correct the deficiency? What will the corrective action require, and when will the Army remove the grounding restrictions?
General Hartzog: The deficiency is caused by fissures, voids or cracks in the propellant grain. These conditions can be corrected by using an improved extrusion die in production, demilitarizing all rockets or motors which are dropped, and 100% x-ray or ultrasonic inspection of grain. This will increase the production cost of the motor by $5 to $10 (using ultrasonic inspection) for future production (x-ray of existing rocket/motor assets will cost approximately $65 each).

Concerning the present inventory, restrictions can be removed when the rocket motors or bare propellant grains are inspected and found to be sound. For the Army this will be a gradual procedure, because we have lots which can be accepted as they are, and other lots which need to be fully inspected before they can be declared acceptable.

Tactical assets are restricted to combat use only and therefore are available in the event of a conflict. The suspension of training assets has resulted in limited training at this time. Screened training assets will be available in Sep 95.

Mr. Hunter: Have there been any foreign users of the 2.75" rocket affected by the grounding?
General Hartzog: Yes, there are many foreign users affected by the suspension.

MODERNIZATION (AVIATION)

Mr. Hunter: How many 2.75" rockets does the Army need each year to ensure training readiness?

General Hartzog: The Army needs a total of 225,752 rockets annually to ensure training readiness. This total includes practice, high explosive, illumination, smoke, and flechette rockets used to sustain unit readiness and the Army Aviation School training base.

Mr. Hunter: Has the 2.75" rocket "grounding" affected unit readiness? When will usable rockets be available for training in order to bring units back to combat ready status? Will these be rockets now in inventory or new rockets from the vendor?

General Hartzog: Grounding of the 2.75" rocket has had a minor impact on unit readiness. The Army has been able to offset the lack of 2.75" HYDRA-70 MK-66 rockets by utilizing an older MK-40 model that was not affected by the suspension. These older rockets will sustain critical unit readiness in the short term. The Army is currently working a System Safety Risk Assessment (SSRA) that will release, from inventory, 140,000 rockets from suspension for training use. Approval of the SSRA is projected for May 95 and will sustain training until Nov/Dec 95. Inspections to clear remaining inventories at Army depots and new production at the vendor facility are scheduled to start in Oct 95 and should make available enough inventory to sustain training readiness for the remainder of FY96 and beyond.

HYDRA 70 ROCKETS

Mr. Hunter: Besides the propellant problems, what other changes to the 2.75" rocket system has the Army had to fix in order to ensure its continued operational use? What did these changes cost?

General Hartzog: All the problems with the Hydra 70 are motor related. One company produced a nozzle with too much sealant affecting approximately 175K rounds. Replacement of defective nozzles is ongoing. The total cost for replacement is approximately $10M.

Mr. Hunter: We understand the current 2.75" rocket uses propellant with lead in it. What has the Army done to fix that and how much has or will it cost?

General Hartzog: R&D for the Hydra 70 is done at the Naval Surface Warfare Center at Indian Head, MD. They have worked to produce a lead free motor with basically the same cost base. To date they have spent approximately $2.5M and are scheduled to have a working lead free propellant grain operational for the FY 97 production buy. Testing and integration will require another $1.5M for a total expenditure of approximately $4.0.

Mr. Hunter: We understand the Army recently awarded a new contract for the current Hydra-70 rocket motors. Was this contract awarded during the time the rocket was grounded for propellant safety reasons? How did the Army justify doing that when it knew the rocket required changes to be useful?

General Hartzog: The changes required to make the motor safe consisted of a change in the propellant extrusion die and 100% inspection instead of a sampling plan. This was determined by an Investigation Team over six months before award of the new contract. This determination was recently reviewed and upheld by a Tri-Service Blue Ribbon Panel. Current plans for implementation of the changes will support the required grain deliveries to the new systems contractor.

Mr. Hunter: What is the Army's projected total unit cost for Hydra-70 rocket motors including vendor, GFE propellant, and costs to rework the inventory?

General Hartzog: The rocket grain costs approximately $185, and the complete rocket motor with the grain costs less than $350.

The Hydra-70 Rocket Motor is extremely inexpensive for the job it does. Because of its low price, performance and long shelf life, countries all over the world have copied the motor. Japan has an ongoing co-production program with the U.S. The cost to inspect the existing inventory (all DoD customers) to cull out defective motors has been estimated to be $50M. (This is a preliminary estimate which will be updated once the x-ray requirements have been finalized. This estimate is based on using x-ray methods that are labor intensive. Alternative automated methods are being evaluated and may bring the cost down).

Mr. Hunter: The committee understands that Army's version of the Hydra rocket is not shipboard compatible. Also that when the Army's 10th Mountain Division went aboard ship during the recent mission in Haiti, the Marines had to give the Army their Hydra rockets which are slightly more shipboard compatible. Last year the authorization committees were made aware of the USN/USMC's need for a 2.75" rocket that fully meets shipboard compatibility requirements, commonly referred to as HERO and IM (Insensitive Munitions). Since the Army is the Single Manager for DoD 2.75" rockets, what has the Army done to meet those requirements?

General Hartzog: It is not uncommon for services to lend each other equipment to meet special situations. In Desert Storm the Marines borrowed M1 Tanks and AT-4 Shoulder Fired Anti-Armor Weapons from the Army, and the Army borrowed a small number or special bunker defeating shoulder fired weapons from the Marines.

The Army in conjunction with the Navy and Air Force has worked to develop an igniter using the latest air bag ignition technology which will satisfy the shipboard requirement and be acceptable to all the services. The new igniter will be ready by the end of FY 95, and will be added to the inventory by Engineering Change Proposal (ECP) during FY 96. Starting with the FY 97 buy, all motors will have the HERO safe igniter.

Insensitive Munitions is another case. Rocket propellant which is less sensitive than the existing propellant costs 3 to 4 times as much, and has less than half the shelf life of the propellant presently used for Army Production.

MODERNIZATION (AVIATION) - HYDRA 70 ROCKETS

Mr. Hunter: How many 2.75" Hydra 70 rockets were consumed in combat during Desert Storm?

General Hartzog: Approximately 4,000 Hydra 70 rockets were fired in combat during Desert Storm.

MODERNIZATION(AVIATION) - HELLFIRE MISSILES

Mr. Hunter: During Desert Storm, did the Army prefer to use HELLFIRE missiles for "soft" targets in lieu of the less costly Hydra 70? If so, why?

General Hartzog: During Desert Storm the Army did use HELLFIRE missiles for point targets, some of which were critical soft targets. This is not to say HELLFIRE was the preferred munition for soft targets. The Army did fire 2.75" rockets at soft targets as well as using the other munitions in the Hydra 70 family, such as smoke, flares, etc. The Army fired approximately three times as many Hydra 70 2.75" rockets as HELLFIRE missiles in Desert Storm. One version of the rocket, the MK66 multipurpose submunition rocket enjoyed high success rates.

MODERNIZATION (AVIATION) - HYPERVELOCITY ROCKET

Mr. Hunter: The committee understands the Army spent considerable funds in the 1980's to develop composite motor, flechette warhead, and hypervelocity rocket (HVR) technology at the Army's Missile Command. Had an operational HVR/flechette warhead rocket been available, would the Army have used it during Desert Storm?

General Hartzog: The Army's Missile Command did some development of hypervelocity rocket technology in the 1980's. This was provided to the combat developer. U.S. Army Training and Doctrine Command (TRADOC), for evaluation and received little support. Hypervelocity rockets were analyzed again in the recent Joint Cost and Operational Effectiveness Analysis (JCOEA) for the Advanced Rocket System (ARS) and it was determined that the marginal increase in accuracy that the higher velocity motor provided did not justify the increase in cost and loss of shelf life. The hypervelocity flechette developed by the Missile Command in the 1980's was primarily for air to air applications and as such would not have likely been used in Desert Storm, where there was not a significant helicopter threat.

HYDRA 70 ROCKETS

Mr. Hunter: The committee understands that industry leveraged the prior Army investment in HVR technology and developed a Non- Development Item (NDI) shipboard compliant 2.75" rocket usable with existing Hydra launchers. Last year, the committee directed the Army to produce, and qualify for operational use, an improved Advanced Rocket System. The Secretary of the Army was also directed to procure 2.75" rockets using competitive procedures that include consideration of the improved rocket. What has the Army done to execute this guidance?

General Hartzog: The Army has never had a requirement for a Hypervelocity Rocket Motor. When the Advanced Rocket System Program did a Joint Cost Operational Effectiveness Analysis (JCOEA), it was determined that the additional accuracy that the higher velocity motor buys does not truly warrant the premium in cost, and shelf life loss. The Navy's main attraction to the motor was the added safety due to the motors improved IM characteristics.

The Army has procured the latest rockets using competitive procedures, and has constantly striven to improve the existing inexpensive motor which meets its needs. The Army, in conjunction with the Navy, has supported the lead free motor and the Mod 4 Rocket Motor. These improvements will meet the HERO requirements of all the services, and the stipulations of the Environmental Protection Agency.

STATUS OF LIGHT AND HEAVY TACTICAL TRUCK FLEETS

Mr. Hunter: "On numerous occasions recently, the Army leadership has stated that tactical truck programs are 'broken'. Most of the attention had centered on the budget proposal to terminate the Family of Medium Tactical Vehicles contract in fiscal year 1996. Tell us briefly about the status of the light and heavy tactical truck fleets."

General Hartzog: "As you can see from the President's Budget, funding for heavy vehicles is for procurement of 202 Heavy Equipment Transporters in FY 97. Procurement of light vehicles is funded in FY 96 and FY 97. Funding procures 565 Up-Armored High Mobility Multipurpose Wheeled Vehicles for the light fleet. As stated in the Army Modernization Plan, the Light and Heavy fleets are in relatively good shape as compared to the medium. The light and heavy fleets have some key model shortages such as Heavy High Mobility Multipurpose Wheeled vehicles, Heavy Equipment Transporters and Heavy Expanded Mobility Tactical Truck wreckers."

INVENTORY SHORTFALL OF HEAVY TACTICAL TRUCK FLEET

Mr. Hunter: "With respect to the heavy tactical truck fleet, what is the current inventory shortfall, by truck type?"

General Hartzog: "Based on current requirements and updated with the latest asset figures and projected fieldings, the following approximate shortfalls are shown: Palletized Load System - 300, Heavy Expanded Mobility Tactical Truck (HEMTT) - 1,000, Heavy Equipment Transporters - 550 modernized systems, Line Haul Systems - none, Engineer tractors - 200."

SHORTFALLS OF REDUCED FORCE

Mr. Hunter: "Do these shortfalls reflect the reduced force structure of the ten active division army and the associated reserve units?"

General Hartzog: "Yes."

COMPARE TRUCK WITH OTHER SHORTFALLS

Mr. Hunter: "How do heavy tactical truck inventory shortfalls compare with shortfalls in other Army equipment?"

General Hartzog: "Tactical truck inventories are generally no different than other equipment in the Army. Some items are more fully resourced than others. The tactical truck problem is more one of aging than of asset fill, particularly in the medium fleet."

INVESTMENT STRATEGY FOR HEAVY TACTICAL TRUCKS

Mr. Hunter: "Explain the Army's proposed "Investment Strategy" for heavy tactical trucks."

General Hartzog: "The Army is in the process of transmitting a separate report on its tactical wheeled investment strategy to the Congress. Heavy tactical trucks are contained in that strategy and will be included in that report."

INVESTMENT STRATEGY AGREEMENT

Mr. Hunter: "Have all elements of the Army agreed to this strategy - - the operations/ requirements people and also the acquisition community?"

General Hartzog: "The strategy has been fully staffed within the Army. It contains various options based on differing funding levels. The Army will use the strategy as a road map for truck modernization based on fund availability and the needs of the Army."

INVESTMENT STRATEGY FUNDING

Mr. Hunter: "To what extent is this strategy funded in the fiscal year 1996 and future year budgets?"

General Hartzog: "The FY 96 and FY 97 funding is contained in the President's Budget. The Army is now developing the budget for FY 98 and FY 99, and is reviewing FY 97. Final funding levels for those years have not yet been determined."

HEAVY TACTICAL TRUCK INDUSTRIAL BASE

Mr. Hunter: What is your assessment of the health of the heavy tactical truck industrial base today and in the near term future?

General Hartzog: The health of the military heavy tactical truck industrial base does not appear well today nor in the future. Oshkosh Truck Corporation is currently the only manufacturer of military heavy trucks managed by the PEO, Tactical Wheeled Vehicles. With completion of two major heavy truck programs (Heavy Equipment Transporter System (HETS) and Palletized Load System (PLS), and lack of funding for truck procurement beyond FY95, the industrial base is severely impacted.

INDUSTRIAL BASE AND FUTURE YEAR BUDGETS

Mr. Hunter: What will happen to this industrial base with and without additional procurement funding in fiscal year 1996 and future year budgets?

General Hartzog: The impacts of reduced funding levels have already begun within the heavy truck market. Freightliner recently announced they had bought an interest in Oshkosh Truck Corporation and plan to assemble Freightliner military vehicles at the Oshkosh, WI facility. The impact on the Oshkosh production facility for Freightliner government business has not yet been evaluated. However, this move will place all military heavy vehicle production in the Oshkosh facility, making its position in the industrial base critical to the Army.

The Army's only current source of specialized heavy trucks (PLS, HEMTT, HET Tractor) is Oshkosh Truck Corporation. The heavy truck industrial base, as it currently exists, is characterized by decreasing volumes of production, and given serious underfunding for the balance of this decade, a much more critical situation in FY96 and beyond. After the current fiscal year, there is no funding for PLS or HEMTT for the balance of the decade and only a one-year investment (FY97) in the HETS Program. Assistance from FMS and other Defense customer funding is expected to be minimal given the budgetary constraints faced by these sources as well.

While the Army and Oshkosh Truck have looked at various contracting strategies to address this problem, the contractor has identified a requirement for at least two PLS equivalent vehicles per day (one of which must be a PLS) as a part of any model mix. Funding profiles beyond the current fiscal year do not provide any such funding.

HEAVY TACTICAL TRUCK MANUFACTURERS

Mr. Hunter: What annual procurement level would sustain the Army's heavy tactical truck manufactures as a viable supplier of vehicles to the Army

General Hartzog: $160 million is the government estimate.

SMALL ARMS INDUSTRIAL BASE

Mr. Spratt: The Small Arms Industrial Base Study, chaired by Mr. Hardison, recommended sustaining the small arms industrial base funding small arms procurements each year as well as allowing manufacturers to perform depot level maintenance, but there were no funds in the Army's FY 1996 budget request for small arms. Why did the Army not follow the advice of the study?

General Hartzog: The Army Science Board's assessment describes very well how we can preserve the small arms industrial base, and we carefully considered the study's recommendations while we formulated the fiscal year 1996 budget. The fact is that Army-wide priorities coupled with the shrinking modernization budget authority prevented us from resourcing for continued small arms procurement, especially at the level proposed by the study. We do, however, understand Congress' intent as detailed in Section 115 of the Defense Authorization Act for FY 1995, and we are currently examining our options to comply with those requirements.

ACQUISITION REFORM PROGRAM WITH SMALL ARMS INDUSTRIAL BASE

Mr. Spratt: When should, and when does the Army plan to initiate an active acquisition reform program with the small arms industrial base?

General Hartzog: The Army is vigorously pursuing reform opportunities across many areas of acquisition. In the case of small arms, we will apply those reform measures that enhance efficiency and make good business sense. The timing of reform implementation will depend on the eventual design and initiation of our long-term program. However, we see some potential for immediate reform in those areas recommended by the Army Science Board Independent Assessment Board.

CONSOLIDATION OF THE SMALL ARMS INDUSTRIAL BASE

The information follows:

With the fiscal year 1995 Congressional direction relating to multiyear contracts, the Army is considering the Army Science Board Independent Assessment Panel's recommendation to downsize the base competitively to not more than two firms. Among the options that facilitate such efforts is bundling similar weapons in a single solicitation and competing a multiyear contract.

ACQUISITION REFORM RELATING TO SMALL ARMS

The information follows:

We agree with Mr. Hardison that the areas of small arms repair parts procurement and overhaul appear to be excellent candidates for reform. Accordingly, as we develop our long-term small arms program we will examine these, as well as other measures that make good business sense, and provide opportunities to realize cost savings under the acquisition reform umbrella.

Questions for Mr. Palaschak

Question from Congressman Hunter:

- Can the ammunition industrial base adequately support procurement requirements for replenishment of war reserve ammunition items, such as 155mm artillery projectiles, when the procurements are requested, at best, once every three to five years?

Answer from Mr. Palaschak:

- No. But this answer is predicated upon several essential points.

  - First, the period of time dictated by DOD for replenishment of combat ammunition expenditures has not remained fixed. After the Army's 1994 Ammunition Functional Area Analysis (FAA) concluded that the munitions industrial base was unable to meet the replenishment times required for all ammunition product lines as directed by the Defense Planning Guidance (DPG), the DOD simply changed the DPG to allow additional time. The operational impact of this action upon our armed forces is that they will be without replacement ammunition for many years after a conflict. Even with the present extended time period (which is classified), several products, including artillery projectiles and propelling charges, cannot meet the DOD timelines for replacing the expenditures for even one Major Regional Conflict (MRC). However, if DOD chooses, they can once again, with the stroke of a pen, extend the "acceptable" replenishment period even further, thereby "correcting" this deficiency. Our armed forces will then be without the replacement ammunition for an even longer time period.

  - The second key point which determines industry's ability to replenish expenditures is whether the production line is active or has ceased production, with the accompanying loss of the skilled workforce. An active production line, supported by a producing vendor base, can surge production and replenish expenditures in a more timely manner, thereby greatly decreasing the time period during which our armed forces are without replacement ammunition. Conversely, a cold base must reestablish its network of component vendors, hire and retrain the skilled workforce, bring dormant production lines back into operating condition, and overcome a plethora of environmental re-permitting hurdles just to restart production. Further, no munition which has been out of production for a few years will be produced without initially encountering quality problems, which will further extend the time periods DOD has estimated for some of the more complex munitions.

Questions for Mr. Palaschak

Question from Congressman Hunter:

- If large portions of war reserve stocks for the second MRC are consumed during normal training, can the ammunition industrial base quickly respond to meet requirements of a second MRC? For example, how much combined lead time and production time does industry need to deliver essential items of ammunition such as 155mm artillery projectiles, 120mm tank rounds, and 40mm grenade rounds?

Answer:

- No. Since the DOD has abandoned any planning for surging the production lines in an emergency, there is no way to respond to the described scenario in a timely manner, even if the production lines for munitions in short supply are actively producing product. Essentially, present DOD planning guidance requires that all munitions required to prosecute both the first and second Major Regional Conflict (MRC) must be available in the stockpile. The current strategy, which depends upon fighting a short, scripted war with the available munitions inventory, no surge planning, and replenishment from a base which may be cold, offers no flexibility for being wrong. Warfare is not as predictable as this strategy presumes. A warm munitions industrial base coupled with realistic plans for surging the base provides the only assurance that our armed forces will not be faced with ammunition shortages that severely diminish the capabilities of their modern weapon platforms and, consequently, add significant risk of increased casualties.

  Lead times and production times are different for each specific munition within a product line. The lead time is also dependent upon the status of the production line (i.e., is it in active production or is it cold?). The time necessary to manufacture planned expenditures for an MRC will vary greatly from item to item depending upon the robustness and responsiveness of each product line's manufacturing processes and equipment. Some examples will help illustrate these points.

  - Artillery projectiles require from 24 to 35 months lead time from a cold base before production is initiated. If these same manufacturing lines were in active production, these times would be shortened by 7 to 12 months. Additionally, if there were in-place plans for surging the base, these times could be further reduced.

- Some small caliber ammunition production lines can respond relatively rapidly to production requirements because they are manufactured on very responsive, well-sized modern production lines. For example, the lead time to prepare for the production of 5.56mm ammunition for the Squad Automatic Weapon is about 13 months. Similarly, armor piercing tank rounds require about 18 months lead time.

- Production times are dependent upon the availability of a skilled workforce and the base's overall capacity. The munitions industrial base has lost over 60,000 skilled workers during the past seven years (2/3 of the total workforce) and layoffs are continuing as the industry reacts to the declining munitions programs. Concurrently the base has been dramatically downsized in accordance with the requirements for replenishment of expenditures contained in the Defense Planning Guidance (DPG). By extending the allowable replenishment time as DOD as done in the recent change to the DPG, the required base capacity decreases accordingly. Since industry does not have access to the classified planned expenditures for an MRC for each item, we are unable to provide an accurate production time period for each of the items requested. However, based upon available information, we believe that the production time necessary to fully replenish planned expenditures from a single MRC (assuming available production lines will operate at the three-shift maximum capacity to fill the shortfalls) ranges from 6 months (40mm) to 3 years (armor piercing tank ammo), with artillery ammunition requiring about 2 years, depending on the type of projectile. This production information should be used with some caution because it is based upon current base capacity and an estimate of expenditures which does not enjoy the insight of classified DOD planning data. The lead time information is accurate data.

- From a cold base, the combined lead time and production time required to replenish expenditures from one MRC is 48 to 53 months in the case of artillery projectiles, and about 54 months for tank ammo. If the munitions needed to fight a second MRC are not on-hand, this data would indicate that we are facing a very serious situation.

Questions for Mr. Palaschak

Question from Congressman Hunter:

- Is there sufficient demand to maintain critical elements of the ammunition industrial base without DOD procurement?

Answer from Mr. Palaschak:

- No. The munitions industrial base is a defense-unique industry, and it is unique among defense industrial sectors. Airplanes have commercial relevance; land combat vehicles use automotive and heavy equipment technology; missiles are used to launch communication satellites. The munitions industrial base develops and manufactures products that are used exclusively for military purposes. With the possible exception of the basic technology in pyrotechnic illumination rounds, the low end of the demolition charge scale, the simplest 9mm handgun rounds, and some supporting technologies, none of the capabilities of the munitions industrial base have commercial relevance.

  Further, many of the fabrication processes in the munitions industrial base are not used in any other industry. For example, exotic materials such as certain boron alloys and depleted uranium have virtually no other applications. Making combustible cartridge cases, melting, pouring and pressing explosives all have no counterpart in commercial industry. The processes of mixing, blending, drying and packaging the energetic materials (TNT, RDX, HMX) for use in munitions components are found in no other sector.

  Basically, the munitions industrial base exists solely to satisfy the requirements of one customer, the Department of Defense.

Questions for Mr. Palaschak

Question from Congressman Hunter:

You paint a bleak outlook for the munitions industry and state that the task force you direct is working on specific recommendations to meet the industry's minimum needs – recommendations which won't be ready for another two weeks.

- Can you give us any idea today of what the task force will recommend?

Answer:

- The following funding recommendations of the Munitions Industrial Base Task Force are based upon our analysis of the munitions industrial base and the FY1996 DOD budget for ammunition. These recommendations are similar in nature and purpose to those which we made last year for the FY1995 budget. As was the case last year, the recommendations are intended to preserve the most threatened portions of the production and design base. They do not and cannot fix all of the readiness issues of the services, but they do keep key portions of the base alive to respond to future service needs or efforts to fix their munitions shortfalls.

  This year's procurement recommendations are somewhat larger than last year's because (1) the FY96 DOD ammunition budget is $81M less than the FY95 budget and (2) the DOD removed $100M from the FY96 budget based upon a decision to pursue an Army reprogramming action using earlier fiscal year funding; we have included this $100M requirement in case the reprogramming attempt is not successful. Absent these two factors, our procurement recommendations would have been similar in scope to those of last year. Our RDTE recommendations are about one half as much as last year, and seek to keep several key munitions research and development efforts and their associated design teams intact.

  In each product area wherein we identified a vanishing capability, we have recommended programs which will preserve that capability and the associated skilled workforce. These programs were selected based upon their operational importance to the armed forces.

TABLE 1

4 April 1995

FY96 ADDS REQUIRED TO PRESERVE CRITICAL MUNITIONS INDUSTRIAL BASE SKILLS AND CAPABILITIES

INDUSTRIAL BASE ISSUES	RECOMMENDED SOLUTIONS	FY-96 ADDS RDT & E	FY-96 ADDS PROC	OPERATIONAL RATIONALE
• ARTILLERY – RDT&E: Insufficient funds to sustain carrier, payload (particularly smart submunitions), or prop charge combustible container development base.	• Continue development of XM231/232 Army Modular Artillery Charge System (AMACS) (PE60640A); prepare for volume production	$7.1M		Increased range capability; increased flexibility
	• Continue Adv. Dev. of XM982 155mm cargo round;	$5.0M		Potential for 40 + KM range, improved accuracy
	• Continue development of Damocles (AIS) at a rate which will sustain this key smart submunition team	$14.0M		Increased P_K against ground mobile targets, including high value missile systems
	• Continue development of Navy Extended Range Guided munition	$9.5M		Navy can't support Marine Corps' new amphibious assault requirements without this round
– Production: Insufficient funds to sustain conventional round industrial base recovery initiated in FY95 and maintain rocket grain base for extended range rounds	• Produce M913/927 105mm HERA round at minimum economical rate of 5000 rounds per month		$30.0M	Provide first modern M927 HERA rounds for National Guard M102 howitzers (340 tubes); 40% increase in range and 80% increase in lethality. Inventory of M913 provides about 220 rounds per M119A1 howitzer; only 2-3 hours of sustained firing for the Army's light forces
	• Supports SADARM supplier at more cost effective manner		$29.7M	Provides initial projectile inventory
– No propelling charges in production	• Produce M203A1 prop charge at minimal rate		$15.0M	Reduce substantial USMC shortfall of longest range propelling charge

TABLE 1 4 April 1995

FY96 ADDS REQUIRED TO PRESERVE CRITICAL MUNITIONS INDUSTRIAL BASE SKILLS AND CAPABILITIES

INDUSTRIAL BASE ISSUES	RECOMMENDED SOLUTIONS	FY-96 ADDS RDT & E	FY-96 ADDS PROC	OPERATIONAL RATIONALE
• FIXED WING CLUSTER BOMBS – RDT&E: Limited evolutionary development	• Flight certify CBU-87 on USMC AV-8's	$3.0M		Enables use of modern replacemants for dateriorating obsolescent cluster weapons now in inventory. Ensures interoperability of USMC and USAF prime munitions.
	• Flight certify SFW on USMC AV-8's	$3.0M		
– Production: Not funded after FY94; lines go cold in FY96/97; lead times go to 18 mo; replenishment time extends to 40+ mo.	• Produce CBU-87 at MEQ for AF		$60.0M	Must rebuild war reserves of modern preferred cluster weapons, depleted by heavy use in Desert Storm. Older weapons in inventory are significantly less reliable, lass effective, and more hazardous to deliver.
• FUZES – RDT&E: There is no substantive project to develop fuzing and safing/arming technology for insertion into new ammunition. Base is going cold.	• Continue technology development of Low Cost Competent Munition (LCCM) GPS fuze	$3.9M		Long range auto-registration resulting in faster more accurate rounds on target
	• Initiate exploratory development of fuze and safing/arming technology	$4.0M		State of the art technology needed to meet future threats (reduction in components' size, weight, susceptibility to ECCM and ground clutter, atc.)
– Production: No production of artillery fuzes funded in FY96 or FY97. Base is going cold.	• Procure sufficient M762/767 fuzes to sustain the electronic time fuze base		$20.0M	Reduce substantial USMC shortfall

TABLE 1

4 April 1995

FY96 ADDS REQUIRED TO PRESERVE CRITICAL MUNITIONS INDUSTRIAL BASE SKILLS AND CAPABILITIES

INDUSTRIAL BASE ISSUES	RECOMMENDED SOLUTIONS	FY-96 ADDS RDT & E	FY-96 ADDS PROC	OPERATIONAL RATIONALE
• MEDIUM CALIBER AMMO – Production: Insufficient funding to sustain medium caliber production at minimum economical rates or to sustain illumination pyrotechnic base	• Procure M792 HEIT 25mm round for Army's Bradley Infantry Fighting Vehicle		$20.0M	Insufficient stocks to meet requirements
	• Procure PGU-27/B 20mm TP rounds for USAF		$10.0M	Needed to assure readiness
	• Procure PGU-27/PGU-28/B improved 20mm round for AF		$18.0M	Replace 1950's vintage M56 round; upgrade USAF Inventory
	• Procure 40mm XM922 IR Round		$5.0M	Extends range of night vision devices by factor of X
• MORTAR – Production: Insufficient funding to sustain illumination pyro base; once base is down, facility/vendor production base activation and development of technical cadre will take 3-5 years.	Produce 60mm, and 81mm HE and illumination rounds at rates sufficient to sustain base, and address inventory deficiencies.			
	• 81mm IR Illum M816		$18.0M Army $ 7.0M USMC	No IR illum capability to support night-fighting operations.
	• 60mm IR Illum XM767		$10.0M	No IR illum capability to support Army night-fighting operations.
Insufficient funding to sustain HE and PD fuze base which will be required to make up 1 MRC shortfalls totalling more than 300,000 rounds	• 81mm HE M889A1		$24.0M	Reduce substantial USMC shortfall of key unit organic fire support ammo

TABLE 1 4 April 1995

FY96 ADDS REQUIRED TO PRESERVE CRITICAL MUNITIONS INDUSTRIAL BASE SKILLS AND CAPABILITIES

INDUSTRIAL BASE ISSUES	RECOMMENDED SOLUTIONS	FY-96 ADDS RDT & E	FY-96 ADDS PROC	OPERATIONAL RATIONALE
• M1A1/2 TANK – Production: No funding for HEAT or KE rounds in FY96. If KE not fixed, multi-year in jeopardy, base stressed, cost increases. HEAT base will go cold if not funded	• Continue M829A2 funding at multi-year rate		$82.1M (1)	Insufficient inventories of preferred round
	• Produce 13,000 additional M830A1 HEAT rounds		$45.0M	Current inventory is only one-half of Army's required level.
• MINES – Production: FASCAM base will go cold with Volcano inventory still short 100,000. Cannot maintain electronic lens assembly base which is critical for self-destruct mines	• Procure Volcano at MEQ rate		$30.0M	Insufficient stock for 1 MRC
Production capability established for self-destruct, hand-emplaced munition for Special Forces will go cold if Army does not commit to procurement in FY96. Downstream need potentially critical.	• Procure SLAM for Army		$10.0M	Army needs multi-fuzed hand-emplaced munitions. Both 18th Airborne Corps end Combat Engineers have urgent unmet needs

(1) Not required if FY95 reprogramming to add $82.1M is approved. If not approved, FY96 add is critical. The planned fiscal year 1996 Army budget was reduced by OSD before being submitted to Congress to reflect offsetting reprogramming planned in fiscal year 1995 for this program. We do not know if the reprogramming will be possible. Therefore, the recommended increase is included to reflect this uncertainty.

TABLE 1

4 April 1995

FY96 ADDS REQUIRED TO PRESERVE CRITICAL MUNITIONS INDUSTRIAL BASE SKILLS AND CAPABILITIES

INDUSTRIAL BASE ISSUES	RECOMMENDED SOLUTIONS	FY-96 ADDS RDT & E	FY-96 ADDS PROC	OPERATIONAL RATIONALE
• ROCKETS – Production: Rocket production is at lowest level in many years with FY97 requirements double the FY96 raquest.	• Procure HYDRA 70 M264 Smoke rocket for the Army		$20.0M	Insufficient stock for 1 MRC
Shoulder-fired base going cold.	• Procura BDM for Army	.	$15.0M	Provide minimum Army inventory of BDM
• SMALL CALIBER – Production: Production of 7.62mm has fallen drastically in FY96 budget to only 7M rounds from FY94/95 average of 45M rounds. Outyear forecasts require production of nearly 100M rounds annually, but base will go cold in FY96.	• Procure 7.62mm at rate which maintains capability		$10.0M Army $10.0M USMC	Both USMC and Army inventories ara short
TOTAL RECOMMENDED ADDS		$ 49.5M	$ 488.8M	

In the course of our examination of the FY96 budget, it became apparent that there are several Army and Marine Corps programs which could be produced much more economically and satisfy significant shortfalls of munitions. Consequently, the Task Force developed a second category of funding recommendations which address these operational shortfalls. While these are not essential to preserving the remaining skilled workforce or the base capabilities, they will, if added to the existing service budget or the Task Force funding recommendations, permit the government to obtain more "bang for the buck" and satisfy high priority service munitions shortfalls.

Item	Service	Funding Addition ($M)
M203A1 Propellant Charge	USMC	9.0
Cal. 50 4/1	USMC	5.0
Cal. 50 SLAP	USMC	5.0
120mm Mortar Smoke	Army	22.0
HYDRA 70 Smoke	Army	7.0
Demolition Items	Army	10.0
	USMC	8.5
40MM M430A1	Army	16.0
Production Base Support	Army	35.0
Demilitarization	Army	10.0

QUESTIONS FOR MR. RABAUT

Questions from Congressman Hunter

Question: The Army has indicated that its FY 96 budget request supports the upgrade of 100 M1A2 tanks rather than the 120 tanks per year that industry says is a minimum sustaining rate. The Army projects that this level may drop to 80 tanks per year in the future. How important is it to achieve a rate of 120 upgraded tanks annually? How much is required to reach this rate?

We received the following response from General Dynamics:

It is extremely important that the rate of upgraded tank reaches 120 annually! First, the critical need for upgrades is to address the threat posed by foreign tank producers building tanks with increased protection and lethality for forces potentially hostile to the U.S. Second, it is not just the contractor who is saying 120 per year. The Army is very desirous of having more than 120 tanks modernized per year in order to ensure the ready to fight and win capabilities of the first to fight units who on deployment could be facing superior threat tanks. The Army reduced tank funding in a programming phase of budget building last summer in order to pay for near term readiness. So it is a matter of affordability and not a lessening of the critical need for these upgrades.

The M1A2 not only solves a key need for deploying tank forces but also is the key to the vision of a digital battlefield and the demonstrated benefits of digitization. The M1A2 is the centerpiece of the digital battlefield and is the only system designed to survive enemy direct fire from large caliber weapons and continue its mission of providing mobile protected fire power.

A five year multiyear contract for 120 upgrades per year is the minimum necessary to do four things:

- allow for forward pricing in a fixed price environment, where the cost of the tank is guaranteed to the Army;
- support future foreign sale opportunities by maintaining tank production at an affordable cost;
- retain the design team in the tank base to provide future tanks;
- avoid severe attrition in the vendor base, who, upon survey, indicate that a third will drop out of the market at less than 120 upgrades per year.

Funding for the five-year multiyear at 120 tanks per year from FY 96 to FY 01 is $3,747B. This is a six year period with the net effect of the multiyear being the execution of the multiyear in a timely fashion that will allow FY 96 to become the

beginning of the multiyear contract (one plus five). Funding in the President's Budget for this same six year period is $3,366B for a shortfall of $381M.

The Army and its contractor have identified savings of $142M so far. Use of the multiyear contract form in itself saves 7% from the cost of an annualized contract. This would make the shortfall $239M.

Two Congressionally authorized programs could create the next two increments of funding for the upgrade program. These are the use of $47M for upgrades from the sales of excess M60 tanks to foreign government. And secondly, the funding of the second year of the program to equip the USMC Reserves with M1A1 tanks and in return paying the Army $110M for upgrades.

With these two funding sources added to the current FY 96 President's Budget and the $30M the Program Executive Officer (PEO) believes will be the additional savings, the Army would only have to find $52M in its programming deliberation to stabilize the tank program at 120 tanks per year in a multiyear contract.

A multiyear is very desirable since it helps provide the best value to the customer by reducing unit price and stabilizing the critical vendor base while allowing the Army to modernize and field units with a reasonable and affordable program.

Question: What are your views on upgrade programs and production rates for the Bradley Fighting Vehicle, the M109-series self-propelled howitzer, and the M113-series armored personnel carrier? Are these systems being upgraded at less than the optimum rates? If so, what penalties or additional costs are incurred by the government and by industry?

Mr. Rabaut: There are no new Bradley Fighting Vehicles, M109 Howitzers or M113 series vehicles being produced and none programmed. Each of these combat systems is currently being upgraded to improve their capabilities and extend their useful life. We prefer to focus more on meeting Army requirements than on seeking business to preserve an oversized industrial base.

Because our segment of the tracked combat vehicle industrial base includes multiple platforms such as the BFVs, the M113 family, M109 Howitzer, M881RV, M9ACE, Breacher, and the Armored Gun System, we are not totally dependent on the upgrade rate of any single system. Our ability to control costs and provide affordable upgrades depends more on the total number of vehicles processed, irrespective of vehicle type, than on a fixed number of a single type of vehicle during the same period.

This flexible capability is a direct result of actions we took starting several years ago in recognition of where our segment of the defense market was headed -- down. To achieve this affordable, flexible operation we

- eliminated excess capacity and overhead to make our price structure more competitive at a reduced business volume;
- adopted a flexible manufacturing philosophy featuring stall built process as opposed to long production lines;
- combined the FMC and HARSCO defense business in United Defense LP to reduce duplication and cut costs;
- continued to invest in all advanced technologies that we envisioned would be required to extend the useful life of our current products;
- established strategic alliances with our vendors and the Army's depot system to make best use of both public and private facilities; and
- reduced our vendor base from 2,000 to 800 suppliers, resulting in better performance at lower cost.

In summary, we have evolved from an operation dependent on an optimum rate for a single tracked vehicle to one where optimum rate consists of the total number of systems and total workload being produced or upgraded irrespective of the number of different types of vehicles. However, an increased quantity of any given vehicle is welcome, anytime, and will have the advantage of reducing prices, sometimes on several different programs. Having said all that, we do have one vehicle upgrade program, the M881RV, which is currently funded at a very uneconomic production rate. We and the Army are seeking additional funding to remedy this problem.

In addition, the currently programmed purchase of M109A6 Paladins provides only two battalions for the Army National Guard, which now contains over 65% of the total Army's artillery (17 artillery brigades -- ARNG; 7 artillery brigades -- active Army). ARNG artillery deployed and fought well in Desert Storm. They will be an even larger part of the fire support element in the next conflict. It is essential their cannon artillery units be modernized on a priority basis. This can best be done by taking advantage of price options in the current Paladin contract, which will require additional funding in the FY 96 budget. These and other proposals are summarized on the next page:

SYSTEM	CURRENT PB (Qty/SM)	CHANGE (Qty/SM)	RATIONALE
M88	9/$23.6M	+16/$32.5M	Increase fielding rate of improved recovery vehicle for M1A2 tanks.
M113A3	240 est/$48.1M	+300/$50M	Accelerate modernization/upgrade
FAASV	-0-	+35/$32M	Match number of FAASVs to number of M109A6s in services; replace losses.
M9 ACE	-0-	+66/$60M	Fill Army requirement;
Paladin	205/$220.2M	+50/$55M	Funding for National Guard Requirements

Note: All these systems are real requirements. This is not an industrial base maintenance recommendation.

Question: In general, the use of multiyear contracts for acquisition programs can provide more stable funding to industry and result in a lower unit price to the government. What impact could the award of a multiyear contract have on the cost of the M1A2 program and the ability of the Army and industry to achieve a higher annual production rate with the dollars available to the program? Are there other programs in which the use of multiyear contracts might be advantageous to the government and to the tracked vehicle industry?

Mr. Rabaut: Multiyear contracts provide an excellent opportunity for the government to save money and we don't think this government should be hung up on the magical 10% saving threshold. The stability provided by a multiyear provides the foundation for a productive team partnership composed of those essential to a program's success -- the government program manager, the TRADOC systems manager, the test community, the industry prime contractor and his subcontractors.

Our on-going Breacher and Armored Gun Systems (AGS) are excellent new production programs that should be candidates for multiyear contracts. Not only would a multiyear save the government money in the production phase, it would facilitate the development of manufacturing processes and procedures and the necessary long-term integrated logistics support package in time to smooth the transition into production. In addition, the on-going M88 and Paladin production programs are also excellent candidates for multiyear procurement.

One caution -- since the tracked combat vehicle budget is at an all time low and projected to remain at that level over the next several years, any multiyear that commits a major portion of that budget to a single program potentially places the remainder of the industrial base at risk. A down swing in the tracked vehicle budget coupled with a guaranteed contract to any single system would deny the Army an opportunity to keep any or all other system upgrades funded.

We also believe that consideration should be given to fashioning a multiyear contract encompassing a number of our programs produced at a common facility which could give the government the flexibility to select the mix of vehicles each year, as long as a minimum program level is maintained.

<u>We received the following response to this question from General Dynamics:</u>

The implementation of a five year, multiyear contract for the Abrams Program provides the following benefits:

- Army gets a needed and predictable fielding plan at the 120/year rate
- It modernizes the "first to fight" units 2 1/2 years earlier than presently planned
- It provides a unit cost savings of 6-8%

- The vendor base remains intact with a stable, consistent volume
- Critical manufacturing capabilities are maintained
- It supports USMC-R-M1A1 requirements
- Future foreign sales opportunities are enhanced
- The entire tank industrial base is stabilized

Question: To what degree does production for foreign military sales contribute to the tracked vehicle industry's ability to sustain a warm production base, or to achieve optimum production rates? What is the foreign sales outlook?

Mr. Rabaut: Foreign military sales continue to be an important source of production to keep the U.S. industrial base warm and to optimize production rates. Equally important, low density systems such as the Armored Gun System will be significantly more affordable to the Army if we are successful in selling the system internationally.

As a defense contractor, we feel a strong obligation to the Army and our stockholders to market our products internationally and are continuously engaged in this effort.

These sales translate into reduced cost of product and do help preserve the industrial base for the Army. Contractors need strong support from the U.S. Government in order to meet foreign competition and have any chance of making major overseas sales.

However, we cannot base our tracked combat vehicle business on foreign sales. We have to organize ourselves so that a minimum acceptable full-service contractor capability survives, based on U.S. defense business. Any foreign sales we are fortunate enough to get serves to reduce prices to the U.S. government and maintain a stronger capability to meet defense requirements.

The prospects for combat vehicle foreign military sales can best be described as grim. In Europe a "buy Europe" approach has hurt U.S. sales as Norway filled their infantry fighting vehicle needs with a product from Sweden and Sweden and Spain filled their tank requirements with a German tank.

The Middle East market has dried up as low oil prices have hurt government cash flow.

The far east has been the only real bright spot as Japan, Singapore, Korea, Thailand and Taiwan have all shown interest in United Defense products.

The Pakistan and India markets have shown real interest in U.S. equipment but the Pressler Amendment denies U.S. manufacturers these opportunities.

We received the following response to this question from General Dynamics:

Foreign military sales of Abrams tanks and derivatives have been important in maintaining the tank industrial base and reducing the unit price for the U.S. Army. In 1990, General Dynamics was contracted by the Government of Egypt to provide 524 vehicle/vehicle sets of M1A1 components in a co-production agreement. Presently General Dynamics is in the 4th of 6 increments and is scheduled to complete the program early 1995. This contract took advantage of the ability to run M1A1 and M1A2 production concurrently and keep warm the capability to provide M1A1 unique spares for the U.S. Army at an affordable price.

The award of the contract from Saudi Arabia for 315 M1A2 tanks was critical in maintaining the tank industrial base. At the time the delivery of the last U.S. M1A2 (62 low-rate initial production M1A2s were authorized and funded) in April 1993, there was no further production planned except for M1A1 Egyptian kits. The Saudi contract kept alive the tank industrial base. It also facilitated the decision to execute the Abrams Upgrade Tank program by making the vehicles affordable and finally was a key factor in the decision by the State of Kuwait to buy 218 M1A2s. The synergy associated with leveraging research and development was also a benefit to the Army as its technology transferred to the next generation of M1-D2.

This has also helped maintain affordability and stability of the base. When FMS ends, a 120/five year multiyear is important to continue this stability.

Question: What is being done by industry to ensure that the subcontractor base for component manufacturers of the main battle tank and other tracked vehicles remains in place? What actions would you recommend that the government take to ensure the subcontractor base is maintained?

Mr. Rabaut: The subcontractor base for component manufacturers has been and will continue to be a major concern that must be addressed on a continuing basis. There are two categories of components that relate to combat vehicles.

1. Government Furnish Material (GFM) Components such as cannons, engine, transmission and a variety of fire control equipment. These comprise between 35% to 50% of the system cost. These are managed 100% by the Army.

2. All Other Components These components are procured by the prime contractor to support new production and upgrade programs and by the Army and Defense Logistics Agency to support fielded equipment. Procurements are not routinely coordinated between the government and the prime contractor.

As time progresses, more and more component manufacturers will cease production due to lack of funding. For components built by these manufacturers, the industrial base and field support will rely on overhauled items.

The long-term health of the base for non GFM components procured by both primes and the government, depends upon a coordinated procurement strategy. In our opinion, the industry prime should be the designated manager of the component base for each combat vehicle.

Concurrent with the breakback of components to the prime contractor, it will be necessary to place all system technical support (STS) with the prime to insure technical management of the component base. As components become obsolete or go out of production it will become necessary to reengineer/redesign components and make design adjustments to the vehicle system to accept the replacement component. Only the prime, who has the necessary engineering staff and a detailed knowledge of the vehicle system, can affordably perform this engineering function. This approach is key to tapping into the broader commercial base. The prime contractor, working with the Army, changes the specifications to commercial specs, redesigns only where necessary, and places the component manufacturing into the commercial base. The DoD cannot afford to support a dedicated military industrial base as in the past.

We received the following response to this question from General Dynamics:

The supplier base for the tank industrial base has been undergoing a consolidation over the past several years. As suppliers continue to exit the market, a conscious effort has been implemented to identify high-quality, financially secure vendors and direct additional business to them. This serves two purposes, (1) it assures the high-quality the Abrams tank deserves, and (2) the increased business base for the supplier makes all the components they provide more affordable.

As sound as this initiative has been, suppliers still continue to exit the market, either voluntarily or involuntarily. A recent survey indicates that at rates of less than 120 per year, 71% of the supplier base is at risk in terms of loss of critical skills, price increases or even market exit (28%). A 5-year multiyear contract at annual rates of 120 tanks per year will provide for the stabilization of the supplier base and minimize the erosion. Once again, our survey has concluded that 120 per year is the point of diminishing returns at which, below that level, risk and affordability is greatly increased.

Question: What are your views on the appropriate division of responsibility between government and industry for production, upgrade, and overhaul of tracked vehicles?

Mr. Rabaut: New production has and should continue to be produced by private industry.

There is no single formula that should be followed in determining the appropriate division of responsibility between government and industry for upgrade and overhaul of tracked vehicles.

While industry should have the major responsibility for upgrades, the M1A2 tank and the Paladin Howitzer are but two examples where private industry and the government can work as a team on selected upgrades. The guiding principal should be to hold the prime contractor responsible for the industrial base and system management. A smart prime with a long-term view of the defense market will work with the depot to the benefit of the total base.

DOD's policy that Depots should retain a core competency on designated systems is sound. High density, high use tracked vehicles that are critical to warfighters have sufficient numbers to assure a flow of overhaul work into the Depot and thereby provide a basis for the work force to maintain its competency. It is very doubtful that low density systems such as the Breacher and the Armored Gun System will return to depots in sufficient numbers to provide the amount of overhaul labor required to maintain competency. Other vehicle systems should probably be considered in this same category, such as M9ACE, M109/Paladin, and M992 FAASV. Long-term life cycle support for these systems should be provided by prime contractors. This support should include turnkey integrated logistics support to include configuration management, supply of parts peculiar, training, field contact team service, overhaul and upgrades.

Because of the prime's long-term commitment to the defense business, the Army can rely on affordable, responsive support without the need to establish and maintain a costly infrastructure.

<u>We received the following response to this question from General Dynamics:</u>

General Dynamics realizes that there now exists a large, post-cold war capacity in both the public and private sectors supporting diminishing volumes. We understand that government and industry must co-exist in this new environment and find ways to make the product affordable as declining defense budgets dictate. In addition, we believe it is important to sustain the critical, core competencies and the supplier base which supports them. A partnership between the public and private sectors on future vehicle upgrade programs is a way to take advantage of the unique capabilities of each sector. The teardown and overhaul capabilities of the public sector are joined with the design, engineering, manufacture and logistics support found in the private sector. The result is preservation of the tank industrial base at the most affordable cost.

Question: You state that, with careful management, the current combat vehicle budget and program, as you know it, **should support a viable business base with medium risk.** Yet, you ask the committee's help to insure the funding for tracked combat vehicle programs is adequate to: (1) preserve long-term readiness of the services by

supporting a reasonable rate of modernization: (2) preserve the tracked vehicle skill base needed for continual modernization and future program; and (3) insure that the programs support the services requirements for medium and heavy vehicles. Can you clarify these points for us?

Mr. Rabaut: In my 7 March statement before your committee I stated that,..."I can say unequivocally that the base today is positioned to serve our customers' currently stated needs." In order to sustain this capability and capacity a number of events or condition must occur each and every year:

- The combat vehicle budget and program must be supported at the present level or higher.

- Fund allocation between the tank base and the remainder of the tracked vehicle sector must remain constant. In this era, the tracked combat vehicle is a zero sum game. A plus-up of one program is at the expense of all others.

- Success in the international market must continue.

If past is prologue, the likelihood that all three of these events will happen every year in today's environment is in question. There is a definite risk that there will be insufficient budget and program in the Tracked Combat Vehicle sector to support a viable business base. This translates into a threat to the long-term readiness of the military services and the tracked combat vehicle fleet, i.e., medium risk.

Concerning your specific questions:

(1) As I stated in my 7 March statement before your committee "...the Services modernization budgets are woefully inadequate to meet the goals that they have set for themselves to transition to the 21st century. Examples include the 2,000 first generation Bradleys required, even for the significantly reduced Army that are technically unfit for combat. Even today armor units are without recovery vehicles that can handle the M1A1 tank." Additionally, our fighting force requires the remanufactured M1A2 tank and M109 Paladin Howitzer and the new production Armored Gun System and the mine field clearing Breacher system. These modernization programs will require the committee's continued support.

(2) The modernization programs mentioned above will not only insure the long-term readiness of the tracked combat vehicle fleet, they will also provide the resources to preserve industry's skill base. Preservation of the industrial base and its skilled work force is not a jobs program. Preservation of the base is a direct result of providing our fighting forces the modern equipment they need to fight and win a future conflict.

(3) Reference the response at paragraph (1), the Tracked Combat Vehicle budget and program are to support equipment and upgrades essential to the military's near-and long-term readiness. Support of the budget at the present or higher levels over the next several years is essential to providing our armed forces the modern equipment they require to fight and win battles in the future.

We received the following response to the question from General Dynamics:

One hundred and twenty (120) tanks a year in a five-year multiyear contract addresses all three issues for heavy vehicles.

Question from Congressman Ortiz:

Question: What impact does foreign military sales have on the ability to preserve the industrial base and keep important skill and production lines available?

Mr. Rabaut. Foreign military sales continue to be an important source of production to keep the U.S. industrial base warm and to optimize production rates. Equally important, low density systems such as the Armored Gun System will be significantly more affordable to the Army if we are successful in selling the system internationally.

As a defense contractor, we feel a strong obligation to the Army and our stockholders to market our products internationally and are continuously engaged in this effort.

These sales translate into reduced cost of product and do help preserve the industrial base for the Army. Contractors need strong support from the U.S. Government in order to meet foreign competition and have any chance of making major overseas sales.

However, we cannot base our tracked combat vehicle business on foreign sales. We have to organize ourselves so that a minimum acceptable full-service contractor capability survives, based on U.S. defense business. Any foreign sales we are fortunate enough to get serves to reduce prices to the U.S. government and maintain a stronger capability to meet defense requirements.

We received the following response from General Dynamics:

The impact of FMS on the tank program is significant because the only U.S. business foreseeable beyond the end of the century is Upgrade tanks at volumes of 120 per year or less and derivatives at even lower volumes. FMS agreements act to support critical manufacturing and the modernization of the U.S. Army forces. Therefore, additional skill are preserved through FMS. Also, the securing of FMS business keeps the per unit cost of all tanks at the most affordable level possible for the U.S. Upgrade tank and helps to offset severe reductions in RD&T and U.S. procurement accounts.

Question from Congressman Evans: Are you comfortable with the progress of the Lightweight 155mm Howitzer program that the Marine Corps and the Army are working on together?

Answer: Yes, I am satisfied with the progress of the Lightweight 155mm (LW 155mm) Howitzer Program. The requirement to replace our aging M198 howitzer first surfaced in 1989. Our current requirement was revalidated by the Assistant Commandant of the Marine Corps in May of 1993. In October of the same year, the Marine Corps and the Army signed a Joint Memorandum of Agreement that lead to agreement for joint development.

This spirit of cooperation has been transformed into concrete results. In January 1994, a Joint Operational Requirements Document Working Group was formed to draft the Joint Operational Requirements Document (JORD) which should be signed by September 1995. Working in parallel with this group is a Cost and Operational Analysis Working Group (with a Marine and Army General Officer serving as co-chairs). We believe that the results of COEA will also be released during September 1995.

The Honorable Nora Slatkin, Assistant Secretary of the Navy for Research, Development and Acquisition is the Milestone Decision Authority for the LW 155mm. Ms. Slatkin designated the LW 155mm program as an Acquisition Category (ACAT) II program in November 1994. She approved the transition of the program to Milestone 0 (Concept Exploration and Definition Phase) on February 3, 1995. Major General Carol Mutter, Commander, Marine Corps Systems Command (MARCORSYSCOM), has the acquisition lead. All the necessary programmatic documentation and agreements are in place, and MARCORSYSCOM will explore every opportunity to expedite the process.

I have a high level of confidence in our current efforts. While I am always impatient when it comes to putting increased operational capability in the hands of young soldiers or Marines, I find our current approach to be both timely and sound.

Question from Congressman Evans: In your testimony you mention several joint countermine programs that you are working on with the Army. Last year, Ranking Member Dellums added needed money ($10 million) in the authorization bill for further R&D on humanitarian demining and countermine systems. I don't think that many of my colleagues realize that the state of the art in this technology really hasn't changed. With close to 200 million landmines spread throughout the world, we need to invest more in humanitarian demining technology and countermine technology for our own forces. Could you please comment on the state of Marine Corps mine countermeasures? What threats do Marines face from the proliferation of landmines? Does increased participation in Operations Other Than War (OOTW) mean that they may be more of a threat?

Answer: We continue to make improvements in the overall state of mine countermeasures capabilities in the Marine Corps. Our biggest concern remains our ability to quickly and reliably locate many of the different landmines on the market today. To correct deficiencies in this area, we have recently begun fielding the AN\PSS-12 hand held mine detector and expect full fielding before the end of this year. In the R&D arena, we are developing Coastal Reconnaissance and Battlefield Analysis (COBRA), a multi-spectral sensor package mounted in Unmanned Aerial Vehicles designed to detect mines and obstacles. We are also looking at an Army program, Airborne Stand-off Minefield Detection System (ASTAMIDS). In the area of breaching/clearance, we are working jointly with the Army on the following: Stand-Off Minefield Breacher (SMB), an explosive net array designed to create a lane through a minefield with an expected fielding of FY02; Anti-Personnel Obstacle Breaching System (APOBS), a man packed linear explosive charge designed to reduce light obstacles such as barbed wire and anti-personnel mines with a projected fielding of FY98; and the Combat Breacher Vehicle (CBV), an armored vehicle with a plow designed to push mines out of its path with a projected fielding of FY00-01. Additionally, the Marine Corps is developing the Magnetic Countermine System (MACS) designed to project a vehicle's magnetic signature to counter magnetic influence fused mines with a projected fielding of FY98.

Landmines span the spectrum of technology from crude devices to intricate systems incorporating sophisticated fusing, hardening, and anti-handling features. In the area of weaponry, landmines are relatively cheap to produce and procure. Additionally, with the break-up of the Soviet Union and the Warsaw Pact, landmines have become a lucrative source of cash for many countries. Third World Countries which desire a quick and inexpensive "equalizer" can purchase large quantities of landmines for a relatively small cost. These countries are generally less likely to employ landmines in an integrated obstacle plan such as those encountered by U.S. forces during Operation Desert Storm. Rather, the landmines that we would encounter during most contingencies would be employed as random harassing or interdiction weapons. Used in this fashion, landmines pose a significant, albeit random, threat during operations that are often termed as "Operations Other Than War (OOTW)."

The threat from landmines during OOTW will undoubtedly increase commensurate with the proliferation of landmines in the hands of Third World Countries. Many of these countries are experiencing internal and external pressures and unrest, and the use of U.S. military force as a stabilizing influence is increasingly likely. The employment of large numbers of low technology, but effective weapons, such as mines, can be anticipated. Terrorist use of mines is a real possibility as the distinction between combatant and noncombatant, soldier and peacekeeper, and military and civilian targets become even more blurred.

A just-completed GAO study has concluded that the Department is procuring or has in development 34 different precision guided munitions (PGMs) that, in total, will cost $68 billion if developed and produced according to plans. Most of these weapons are still in development.

Question: What is the Department doing to eliminate duplication /and redundancy in PGM weapon development?

General Mundy: PGM's are expensive propositions due to inherent high risk technology and limited procurement quantities. Service specific PGM's further exacerbate what are already high cost programs. Eliminating duplication and redundancy in PGM weapon development is a priority and Department wide interoperable munitions is viewed as a solution to the problem. The Joint Requirements Oversight Council (JROC) has taken the position that future aviation munitions should be interoperable. Those future weapons not able to meet interoperability requirements will be required to undergo a waiver process at the JROC level. Those munitions currently in development that do not meet interoperability requirements are being evaluated for interoperability and any associated potential cost savings. There will, by necessity, continue to be differences in idividual service requirements, such as the Navy/Marine Corps need to field insensitive munitions to increase shipboard safety of operations while the Army and the Air Force, who do not routinely fight from the sea based platforms, do not want to pay for these kinds of enhancements.

The Marine Corps endorses munitions interoperability requirements. Aside from developmental cost savings, they provide for potentially significant savings in the areas of procurement, maintainability, supportability, and logistics.

Question: In view of the role of force enhancements to the Bottom Up Review force and in light of the cancellation of TSSAM, what changes have been made in the PGM modernization program to fill the gap created by the TSSAM cancellation?

General Mundy: Within the DoN, the strategy with the Standoff Land Attack Missile (SLAM) was to provide the fleet with an interim standoff weapon capability pending the successful completion of the TSSAM program. The cancellation of TSSAM has caused the DoN to pursue the SLAM-ER (Expanded Response) program which is intended to build on the previous SLAM strategy with an improved capability, further reducing the urgency for a new start program. Studies have shown that SLAM-ER can fulfill the DoN Standoff Outside Area Defense (SOAD) requirement through 2005 and beyond.

Question from Congressman Hunter: What is the Marine Corps' current requirement for CH-53E heavy lift aircraft? Is this requirement fully funded in the six-year budget? If not, why?

Answer: Our total CH-53E aircraft requirement, including pipeline and attrition and the Marine Corps Reserve, is 197 aircraft. This program is not fully funded. Fiscal constraints and competing funding priorities prohibited us from programming funds to satisfy this requirement, and we only have 160 aircraft in our inventory today.

Our Reserve units are currently flying 20 year old RH-53D aircraft which were made available to the Marine Corps when the Navy fielded their newer MH-53Es. Fielding 18 CH-53Es in the Marine Corps Reserve Squadrons would complete our "mirror image" initiative by giving the reserves the same aircraft as the active forces.

Last year, Congress gave the Department of the Navy the option of using CH-53E appropriated funds to procure more CH-53Es in lieu of closing the production line. We will pursue this initiative, and we have asked the DoN Comptroller to release the necessary funds to initiate contracting.

Question from Congressman Hunter: This question I will ask each of the four service representatives and I ask that it be answered for the record hopefully within ten days to be delivered to us. Post-Cold War force levels require less equipment than Cold War forces. If we meet these lower equipment levels, by retiring the oldest equipment first, we should be able to reduce the average age of the equipment that remains, at least in the near-term. Some point, however, average equipment age will begin to increase again. The question is, when will the average age of the tactical aircraft and surface ships begin to increase? I would appreciate that for the record.

Answer: The end of the Cold War has not significantly altered our equipment requirements. The Marine Corps was not as rigidly structured to fight the Soviet Threat as were some of our sister services. As an expeditionary force with global responsibilities, our commitments have not decreased, but have in fact increased, since the fall of the Berlin Wall. Since 1992, we have drawn down our manpower from 197,000 Marines to 174,000 Marines, and we have retired many of our aging tactical aircraft such as the A-4, A-6E, OV-10, and AH-1J. These TACAIR reductions have completed our downsizing retirement. We are projecting to procure fewer aircraft in some of the future years than we will attrite/retire; therefore, the average age of our tactical aircraft will start to increase beginning this year.

The average age of surface ships is more appropriately answered by the U.S. Navy. However, procurement of LHD-7 and the 12 LPD-17 class amphibious ships will substantially modernize the amphibious fleet.

Question from Congressman Hunter: What are the requirements to upgrade or extend the life of the Marines' CH-46s to provide appropriate medium lift capability until fielding of the V-22? Are these requirements fully funded in the six-year budget? If not, why?

Answer: The CH-46 upgrade consists of two programs. The first is the Dynamic Component Upgrade (DCU), and the second is the Service Life Assessment Program (SLAP). The DCU is a four year fully funded safety of flight program that replaces the dynamic components in the flight control system, drive train and rotor system. This upgrade does not enhance the performance of the aircraft but returns the performance of the CH-46 to its original characteristics. The DCU replaces aging components that do not have the service life or performance characteristics to allow the aircraft to complete the assault support mission. The SLAP is an assessment of the airframe and aircraft components and will define the necessary maintenance required to support the CH-46 until it is replaced by the V-22. Both the DCU and SLAP are fully funded in FY96 through FY99.

Question from Congressman Hunter: What is the Marine Corps' requirement for the V-22? Is this requirement fully funded in the six-year budget? If not, why?

Answer: The Marine Corps needs 425 MV-22s to meet our warfighting requirement for 22 squadrons (18 active and 4 reserve) of medium lift aircraft. The program is fully funded in the FYDP for the Low Rate of Initial Production of the first 33 USMC MV-22s and 4 USSOCOM CV-22s. We will request funding in subsequent FYDPs to procure the remainder of our requirement.

Question from Congressman Hunter: What is the requirement for the amphibious transport dock ships? Why was the first ship of class slipped from FY 96 to FY 98? Are there plans to buy 12 of these ships--one for each amphibious ready group?

Answer: Twelve LPD-17 class amphibious ships are required to attain the fiscally constrained amphibious lift goal of 2.5 MEB equivalents, which is required to support the National Military Strategy. Additionally, twelve Amphibious Ready Groups (ARGs) are required to maintain flexible forward naval presence in support of this strategy. Each ARG will consist of a large deck amphibious assault ship (LHD, LHA, or LPH), a LPD-17 class amphibious assault ship, and a LSD-41/49 class amphibious assault ship. This amphibious ship mix translates into the requirement for 12 LPD-17s, one per ARG.

The LPD-17 provides improved capabilities in self-defense, survivability, C4I, aviation, and the necessary vehicle square to attain the 2.5 MEB equivalent amphibious lift goal. Moreover, the LPD-17 will preclude block obsolescence, as older amphibious ships are retired in the next decade. LPD-17 will be the first LPD class amphibious ship authorized in over 30 years.

LPD-17 procurement has been slipped from FY96 to FY98 due to competing funding priorities for readiness. Current plans are to procure and deliver twelve LPD-17 class amphibious assault ships between FY98 and FY09.

Question from Congressman Hunter: What is the Marine Corps' requirement for a seventh LHD Amphibious Assault ship? How much of a penalty is going to be incurred through shut-down and start-up costs of the LHD production line if the LHD-7 is funded in FY 01?

Answer: Twelve Amphibious Ready Groups (ARGs) are required to maintain flexible forward naval presence in support of the National Military Strategy. Each ARG is built around a large deck amphibious assault ship (LHD, LHA, or LPH), which translates into the requirement for 12 of these highly capable ships. Five LHAs and four LHDs are currently in service; two additional LHDs are under construction. The twelfth large deck amphibious assault ship will be LHD-7, which will replace the last of our aging LPHs, USS Guam (LPH-9). The current plan is to procure LHD-7 in FY01, with delivery scheduled for FY07. In order to retain the required twelve large deck amphibious assault ships in service, the USS Guam will be maintained in an Naval Reserve Fleet (NRF) status commencing FY98.

The option remains to procure LHD-7 as early as FY96; this option will expire on 31 Dec. 1995. A delay in LHD-7 procurement from FY96 to FY01 will result in a projected cost increase of $700M ($2.1B in FY01 vice $1.4B in FY96).

Question from Congressman Hunter: What ramifications does the Army's scaling back its M1A2 upgrade program have for the Marine Corps? What is the Marine Corps doing to upgrade/modernize its tank fleet?

Answer: The Marine Corps is not aware of any Army plans to scale back the M1A2 program. The Marine Corps is not procuring the M1A2; therefore, there are no direct procurement implications. The National Defense Authorization Act For Fiscal Year 1995 directs the transfer of 24 M1A1 common tanks from the U. S. Army to the U. S. Marine Corps during FY95 and an additional 24 M1A1 common tanks during FY96. These transfers were tied to increased funding for the Army's M1A2 program. If this funding is not provided to the Army in FY96, the transfer of the remaining 24 tanks could be delayed, which would result in unfilled Marine Corps Reserve M1A1 tank requirements.

Through upgrades, we have improved the lethality; survivability; mobility; and Reliability, Availability and Maintainability (RAM) of our M1A1 common tank fleet. We will pursue additional upgrades based on the future threat and RAM considerations. Future improvements may include capabilities described in the current M1A2 requirement and/or other developmental programs.

Congressman Hunter: The Navy has elected to forego procurement of a first-day, survivable, deep-strike aircraft to replace the retiring A-6 and proposes a modest upgrade to the F-14 in the near term. The decision to produce the F/A-18E/F delays the acquisition of any such aircraft until at least 2010-15. If the Navy doesn't need such an aircraft for 15 years, what is the requirement for it at all?

Vice Admiral Lopez: The Navy had to make an assessment of the risk to our forces in choosing to not pursue a more stealthy aircraft than the F/A-18, which does incorporate significant signature reduction over current generation aircraft. We decided, given the current and projected threat, that with moderate stealth and other suvivability enhancements, the F/A-18E/F would deliver a very credible warfighting capability until we could field a new technology aircraft, spawned from the Joint Advanced Strike Technology program in the 2010 timeframe. This date is only a couple of years beyond the original IOC for the AFX program.

With respect to the requirement for a first-day, survivable, deep-strike aircraft, the Navy still has a requirement to be able to project power ashore with each carrier airwing anywhere, anytime, and in any weather. The combat striking radius of our aircraft can be extended by inflight refueling. The ability to fly the all-weather, deep-strike mission will be reduced by the retirement of the A-6 aircraft; however, this loss in capability can be offset in most situations through alternative tactics. Considering the present threat, the Navy is accepting a moderate short term risk in its ability to project power ashore with the F/A-18C and F-14 multi-mission aircraft. Recapitalization of the fleet is planned with the introduction of the F/A-18E/F and eventually JAST.

The Navy plans to meet all of its requirements with a responsible plan; however, the fiscal realities of today do require a short term risk to achieve the recapitalization of our forces.

Congressman Hunter: In your discussion of JAST in your statement, you list first day survivability as a requirement for a JAST derivative aircraft. What does "first day survivable" mean; is an F/A-18E "first day survivable"? Do all future Navy and USMC aircraft have such a requirement? What is the cost of this requirement?

Vice Admiral Lopez: In the context of the Navy's requirement for the JAST program, first day survivability is the ability of an aircraft to strike any potential enemy target on the first day of a conflict with minimal attrition. The F/A-18E, which incorporates significant signature reduction, is survivable with concurrent employment of additional airwing strike support aircraft in threat jamming and suppression roles. As the threat increases the number of support type aircraft required to maintain an acceptable attrition rate goes up. Incorporating a more stealthy aircraft into the airwing significantly

reduces the number of strike support aircraft required for highly defended targets.

All future Navy and Marine Corps strike aircraft will have a first day capability. The level of survivability for each aircraft will be a function of their projected threats and mission requirements. The specific cost for each aircrafts' survivability enhancements will be design specific and will depend on the aircrafts' concept of operations and projected threat environment.

Congressman Hunter: Regarding JAST and ASTOVL, can you tell me what specific affordable Air Force, Navy, and Marine Corps requirement each of these aircraft is intended to meet? Please be specific with regard to range, payload, takeoff/landing distance, stealthiness, and maneuverability relative to current Air Force and Navy aircraft.

Vice Admiral Lopez: Service needs being addressed by the JAST program are as follows:

USN: first day of war survivable, stand alone, strike fighter aircraft to complement the F/A-18E/F.

USAF: multi-role aircraft (primary air to ground) to replace the F-16.

USMC: ASTOVL aircraft to replace the AV-8B and F/A-18.

As stated, all three systems are multi-role aircraft with a primary role of ground-attack. Specific system requirements do not yet exist because, by design, the JAST program is providing the Services the key cost vs. performance trades necessary to achieve an affordable solution. A crucial aspect of the JAST program mission is facilitating the evolution of fully validated, affordable operational requirements. The JAST program Integrated Product Teams of warfighters and technologists use a strategy to task process. This disciplined approach will also use an extensive underpinning of modelling, simulation and analysis to help the Services develop a set of requirements with maximum focus on jointness, and evolve them over time consistent with technology's ability to support them affordably. The JAST program office, working with the requirements staffs from the Air Force, the Navy and the Marine Corps, and teamed with industry, is facilitating the requirements definition efforts. This very successful activity will culminate in the Services' Joint Mission Needs Statement (JMNS) this summer, which will be validated by the Joint Requirment Oversight Committee. The Services' Joint Operational Requirements Document is anticipated in 1998.

Congressman Hunter: JAST, to include ASTOVL, is intended to provide a next generation common, affordable aircraft for multi-service use. What common criteria, to include range, stealthiness, number of engines, number of cockpits, armament, and maneuverability have the three services agreed to for the next fighter/attack aircraft?

Vice Admiral Lopez: As previously noted, specific weapons system requirements have not yet been determined. The Government requirements determination process and contractor concept design development efforts are both on-going, and both include cost vs. performance trades. It is far too early in the process to have identified specific weapon system characteristics. The results of the recently completed JAST program Concept Exploration phase underscored the possibility and benefit of commonality as a viable means for achieving significant savings in next generation strike aircraft. The key conclusion of the contractor studies is that a family of aircraft can meet Air Force, Navy, and Marine Corps needs, with potential life cycle cost savings of 33-35% with a common production line and application of cost-reducing technologies. This "family of aircraft" approach was chosen based on the weapon system contractors' belief that the needs of the Air Force, Navy, and Marine Corps can be met within a common design space. The degree of Service commonality varies between 70% and 90% with individual designs, bringing with it the cost benefits of a common depot, commonly supported logistics trail, and increased joint service interoperability.

Congressman Hunter: How many different aircraft types do you see evolving from the JAST-ASTOVL program? What affordability studies have been done relative to these programs?

Vice Admiral Lopez: The JAST-ASTOVL program is looking at a common family of aircraft to meet the Services' needs, (Air Force, Navy and Marine Corps). Since JAST is now in the concept definition phase, the program is still trying to define the actual aircraft, and the amount of commonality between the three variants in the family is still to be determined. JAST's goals are for greater than 70% commonality between the variants.

The affordability trades for the family of aircraft are an integral portion of the JAST process. The family of aircraft concept will be optimized for a cost effective solution for all three services. However, because the design evolution process has just started, actual pertinent trades have not yet been completed.

The ASTOVL program has been fully integrated with the JAST program. JAST program contractors are converging on a design concept for a family of aircraft with three variants (including a STOVL variant) that can meet the needs of the USN, USMC and the USAF. Recently completed program Concept Exploration studies underscored the benefits of commonality in achieving significant savings in the development and production of the Services' future strike aircraft weapon systems. Affordability studies were completed by all major U.S. weapon system contractors, i.e. Boeing, McDonnell-Douglas, Northrup-Grumman, Lockheed and Rockwell. The program entered the Concept Development phase in December 1994. Affordability studies in the form of cost vs. performance trades will continue in this phase

as the contractors develop aircraft systems designs that take advantage of the "family of aircraft" concept and define the necessary leveraging technology demonstrations.

Congressman Hunter: In the past, DOD has argued that the EF-111 and EA-6 aircraft were complementary, not redundant. What was the process by which it was determined that the EF-111 will be retired and the EA-6B retained? Since the EA-6 is limited with regard to speed, what aircraft will do escort jamming?

Vice Admiral Lopez: The decision to retire the EF-111 and retain the EA-6B was determined during the FY 1996-1997 Department of Defense budget development and review.

The Navy has determined that supersonic airspeeds do not enhance the coverage afforded fighter and attack aircraft. The advantage provided by jammer support aircraft is best utilized in a stand-off position from the attack and fighter aircraft, where the disparity in airspeeds is not a critical shortfall.

STATUS OF NAVY A-12 LITIGATION AND FUNDING PLAN.

Congressman Hunter: The A-12 contract was cancelled in 1991. The committee understands that there is a potential liability to the government of $2 billion to settle litigation with the contractor. What is the status of this litigation and what are the plans to fund this government liability?

Vice Admiral Lopez: Trial in the Court of Federal Claims is scheduled to begin on 6 November 1995. Both sides are preparing for the trial. The contractors were paid $2,687.2 million under the contract. The contractors have claimed that the Government owes them an additional amount of approximately $2 billion, plus interest. The government denies that it owes any additional amount to the contractors and has demanded the return of $1,352.5 million as unliquidated progress payments. Any money judgment against the Navy in the Court of Federal Claims would be paid initially from the judgment fund created by 31 USC §1304. The Navy would be required to reimburse the judgment fund out of available funds or by obtaining additional appropriations. The Navy has not budgeted any amount for such a reimbursement because it believes that it has meritorious defenses to the claims of the contractors.

Congressman Ortiz: What type of modernization efforts can we expect to see in the area of mine warfare? Has the Navy delayed or canceled any of its plan to upgrade and improve our mine warfare technology and capability?

Vice Admiral Lopez: Many improvements to our mine warfare capability have been recently implemented, and will continue to be implemented in the near and far term future. In general, the Navy is embarked upon an aggressive program to improve mine countermeasures in the shallow water area, and to more closely integrate mine countermeasures within the operations of our overall naval and marine forces. Specific mine warfare accomplishments recently achieved include:

a. Several critical initiatives at the Mine Warfare Center of Excellence, Ingleside, Texas have signaled the beginning of improved Command, Control, Communications, Computers and Intelligence (C4I) for mine warfare operating forces. Secure line-of-sight voice and data circuits have been added to Commander, Mine Warfare Command's (COMINEWARCOM) command center, and the command center has become a node in the Joint Maritime Command Information System (JMCIS). In addition, a special mobile command center (van-containerized) is being acquired by COMINEWARCOM to provide MCM commanders access to the Navy's worldwide C4I architecture through standard systems. Delivery is anticipated to be 4QFY95.

b. COMINEWARCOM has received an initial version of the Mine Warfare Environmental Decision Aids Library (MEDAL). Developed as a baseline JMCIS mine warfare segment, MEDAL will greatly aid mine warfare operational planning.

c. The last two of the 14-ship AVENGER (MCM-1) class mine countermeasure ships were delivered and accepted by the Navy in 1994. All 14 MCM ships are now in active commissioned service. The last four 1950's era MSOs were decommissioned in 1994.

d. The second MHC-51 class ship, USS HERON (MHC-52), was commissioned in August 1994. We plan to deliver two MHC 51 class ships this year.

e. MCS-12, Mine Countermeasures Command, Control, and Support Ship (MCS) will begin conversion (USS INCHON (LPH-12)) in March 1995 at the Ingalls Shipyard, Pascagoula, Mississippi. Delivery is scheduled for April 1996.

f. The last 4 of the new MH-53E airborne mine countermeasure (AMCM) helicopters were delivered in 1994.

g. The former reserve AMCM squadron, HM-19, was disestablished and became fully integrated with its counterpart active AMCM squadron, HM-15, in Alameda, California. The squadron now has 12 aircraft, 6 active and 6 reserve. HM-18 (Reserve) and HM-14 (Active) will fully integrate in Norfolk, Virginia later in 1995.

h. The QUICKSTRIKE mine target detection device (TDD) MK-71 passed OPEVAL in August 1994, with achievement of approval for limited fleet introduction. Full fleet introduction approval is anticipated after additional testing in early 1995. At that time, the new QUICKSTRIKE TDD MK-71 development will be fully complete and approved, and will be available for procurement as required in the future. No current procurement plans exist, however. Successful completion of the QUICKSTRIKE TDD MK-71 provides the Navy, for the first time, the potential for production of a micro-processor-controlled, programmable-

algorithm target detection device. This will assure effective bottom mining capability adaptable to a changing future enemy submarine and surface ship threat well into the next century.

i. Procurement of the United Kingdom Versatile Exercise Mine System (VEMS) continues, with contractor-developed improvements being tested by the Navy.

j. Milestone III (Approval for Full Production) was achieved for the AN/SQQ-32 mine hunting sonar in August 1994.

k. Development of the AN/SSQ-94-T1 Combat System Integrated Trainer is on schedule with IOC planned for September 1996 for MCMs and December 1996 for MHCs.

l. With respect to development of organic mine reconnaissance capability, the Remote Minehunting Operational Prototype (RMOP) was completed in October 1994. RMOP utilizes the Canadian DOLPHIN semi-submersible system to tow an in-service airborne mine hunting sonar (AN/AQS-14) to serve as a remote mine countermeasures system deployable from surface ships. RMOP represents the first step in achieving a truly organic, remotely operated mine reconnaissance system.

m. Consistent with our top priority for achieving clandestine mine reconnaissance capability, a plan for development of the Navy's Unmanned Undersea Vehicle (UUV) was developed by the Navy for the Office of the Secretary of Defense (OSD); was approved by The Director Expeditionary Division (N85) and Assistant Secretary of the Navy (Research, Development, and Acquisition); and was concurred with by the Advanced Research Projects Agency (ARPA). This plan was forwarded to congress by OSD in June 1994. The plan responds to congressional action originating from FY94 Senate Appropriations Committee direction which was sustained in conference. Incorporating UUV program priorities established by N85, the plan consolidates the Navy's UUV efforts into a coordinated program.

n. Milestone I (Concept Exploration and Definition) for the Shallow-Water Assault Breaching System (SABRE) was achieved 3QFY94.

o. The Distributed Explosive Technology (DET) program has successfully demonstrated array and harness structural integrity through land-based tests.

p. In the area of organic mine countermeasures, the Multi-Mission Craft, Air Cushioned (MCAC) program is on schedule with plans in place to provide LCACs with the MCAC modification. System testing is underway, and two MCAC crews have been trained for MCAC participation in the up-coming KERNAL BLITZ '95 exercise.

q. The Breach Lane Navigation System is on schedule with milestones I/II/III being combined and scheduled for accomplishment 4QFY95. Fifty units are planned to be in the fleet by FY96/97.

r. Development of the AN/AQS-20 Minehunting Sonar (airborne) is proceeding with a System Threat Assessment and Requirements Study (STAR) having been completed in June 1994. Milestone III is scheduled for 4QFY97 with production start in FY98.

s. A STAR for the Airborne Mine Neutralization System (AMNS) was completed in FY94. Program funding is scheduled to commence FY96 with production planned for FY01. Several industrial concerns are developing systems that may meet Navy requirements for AMNS with the potential of consequent R&D savings for the Navy.

t. Low rate initial production has been approved for the A/N37U-1 Mechanical Sweep system (airborne).

u. The Navy continues to aggressively interface with our allies in the area of mine warfare. In addition to our participation in NATO mine warfare organizations, we have collaborative efforts established with France, Germany, The Netherlands, Italy, and Canada. We also have active mine warfare data exchange agreements with these countries and many others. The U.S. Navy fully recognizes the strong mine warfare capability that our allies offer and is pursuing every possible approach to utilize this iternational resource.

v. The Navy is working directly with the Marine Corps through the Marine Corps Combat Development Command to develop a common doctrinal concept for mine countermeasures in littoral power projection. In January 1995 the first step in this process was completed with the approval of the coordinating draft of Fleet Marine Force Reference Publication (FMFRP) 14-25 "Mine Countermeasures in Littoral Power Projection." Coordinated effort will continue through 1995 with a series of seminars and wargames co-sponsored by the Navy and Marine Corps to examine and refine mine countermeasures concepts, doctrine, and tactics.

Along with the achievements listed above, the following modifications to our mine warfare program have been implemented:

a. Organizational

(1) COMINEWARCOM has taken on additional duties as Commander, Naval Surface Group, Ingleside (COMNAVSURFGRU, Ingleside), reporting administratively to Commander, Naval Surface Forces, U.S. Atlantic Fleet (COMNAVSURFLANT).

(2) Mine Countermeasures Groups One, Two, and Three have been redesignated Mine Countermeasures Squadrons (MCMRONs) One, Two, and Three.

b. SAM II, the joint U.S.-Sweden program aimed at development of a small air-cushioned vehicle for remote mine countermeasures purposes, will be terminated by the U.S. upon completion of phase I (project definition) in 4QFY95. Sweden was officially notified of this fact in December 1994. Although much excellent work on the parts of both countries has resulted from this cooperative program, funding constraints preclude program continuation within the U.S. As noted in our mine warfare plan, we are pursuing a remote capability for MCAC.

c. The Buried Mine Detection System program has been cancelled as a stand-alone effort due to funding constraints and technical overlap with other programs. Buried mine hunting capability, while still very much a mine countermeasures requirement, is being developed in conjunction with other programs such as our UUV program, and Remote Mine Hunting System.

d. Two mine countermeasures Advanced Technology Demonstration (6.3A) programs have been discontinued because the technologies that would have been developed in each are being provided through other activities. The Airborne Minefield Reconnaissance System has been terminated with associated technologies continuing in the area of airborne laser mine detection, and Semi-Autonomous Underwater Vehicle (SAUV) has been dropped with associated technologies being provided by work in the Remote Mine Hunting system and in the UUV program.

e. Early operational assessment of two advanced development models of the Airborne Laser Mine Detection System (ALMDS) was conducted 4QFY94. Deficiencies were identified for retesting. Milestone II has, therefore, slipped from October 1994 until later in 1995. Procurement for ALMDS has been consequently slipped one year to now begin in FY99.

f. Procurement efficiencies have resulted in approximately a $20M saving in completion of the procurement of the AN/SQQ-32 mine hunting sonar.

g. RDT&E funding for Remote Minehunting has been adjusted, moving the program to the right approximately two years due to funding constraints.

h. Procurement of the Mission Package-3 for the Mine Neutralization System (adding neutralization for moored mines), has been reduced over the FYDP due to funding constraints.

i. A new line for Explosive Neutralization has been added beginning FY98. This line provides transition for the Advanced Technology Demonstration (ATD) program for Explosive Neutralization for Surf Zone Mines.

j. Procurement of Obstacle Breaching equipment has been delayed by two years due to a technical restructuring of the program.

k. SABRE and DET development has slipped due to restructure of the programs to design systems for employment from the sea vice from the beach. SABRE and DET are expected to reach
MS III in FY99.

l. A program has been added to provide a transition for the existing ATD for Advanced Lightweight Influence Sweep System (ALISS). The new line commences FY98.

m. The FY96 submission for Mk 105 Magnetic Sweep Upgrade reflects equipment for only one squadron. Subsequent action has established two squadrons, therefore the FY97 budget submission will reflect the additional systems.

n. The FY95 budget reflected the Submarine Off-board Mine Search System (SOMSS). SOMSS has been cancelled and the Unmanned Underwater Vehicles UUV program has been put in its place.

o. Multi-purpose Craft, Air Cushioned (MCAC) has been expanded considerably since FY95, mostly in the areas of equipment procurement and manpower support.

AEGIS

Congressman Saxton: The Aegis ship represents the centerpiece of the Navy's tactical ballistic missile defense. The radar and missiles carried by the Aegis ships can provide protection to our landing forces during debarkation. As the dangers posed by the proliferating tactical ballistic missile threat increase and become more apparent, it is difficult to understand why DoD has reduced the Aegis ship procurement for FY 96 to only two ships. Can you comment on the apparent disconnect between the need for Aegis combatants and the Navy's procurement plan?

Vice Admiral Lopez: The reduction in FY 96 procurement should not be interpreted as a sign that the Navy is not committed to the essential ARLEIGH BURKE guided missile destroyer program and deploying a Theater Ballistic Missile Defense (TBMD) capability as early as feasible on Aegis ships. As I stated in response to an earlier question, on December 9, 1994 Secretary Perry announced several changes in DoD modernization programs that would allow $8 billion to be shifted to higher priority programs, specifically those affecting military pay, readiness, and quality of life. The modernization changes are part of a package of FY96-01 defense budget decisions consistent with the priority that President Clinton and Secretary Perry have placed on readiness and on people in the U.S. Armed Forces. The DDG 51 program, which reduced procurement from 18 to 16 ships in the FY96-01 period, was one of seven programs affected by those decisions. The reduction will not impact the introduction of Theater Ballistic Missile Defense capability on Aegis combatants. It does, however, delay procurement and introduction into fleet operations of two ARLEIGH BURKE destroyers for several years beyond 2001.

AEGIS INDUSTRIAL BASE

Congressman Saxton: Are you confident that a procurement rate of less than 3 Aegis destroyers per year will <u>not</u> threaten the Aegis industrial base? What is your answer based on?

Vice Admiral Lopez: On February 10 and again on March 14, Secretary Perry testified that a procurement rate of 2.7 ships per year (DDGs) should maintain two shipyards. It is important to note that the industrial base which supports Aegis and surface combatant ship construction consists not only of the actual shipbuilders - Bath Iron Works and Ingalls Shipbuilding. It also includes the combat system manufacturers, gas turbine propulsion manufacturers, reduction gear manufacturers, and a myriad of other vendors, large and small, who produce specialized components for the Aegis ships and their combat system. The components produced by these "non-shipbuilders" account for more than half of the total ship cost. In September 1993, the Aegis Program Manager completed a study which examined the effects of decreased DDG production rates across the existing industrial base. The study found that a 3 ship per year program, with some additional work, provides sufficient work to maintain a viable industrial base. The study also found that sustained procurement rates below 3 ships per year will likely result in the erosion and eventual loss of some of the critical shipbuilding and combat system skill bases. Many of the smaller second and third tier vendors depend heavily on Navy shipbuilding, in particular the destroyer program, for a significant portion of their business base. Some of these vendors are already operating at or close to minimum economical production rates and may decide to forego unprofitable destroyer business and seek other business opportunities, taking with them key processes and skills. This, in turn, will result in increased unit costs. In support of our force structure, force level, and recapitalization goals, we plan to resume and maintain a 3 ship per year acquisition profile

commencing in FY99. The question of how best to procure the remaining 25 destroyers is the subject of an ongoing study by the Assistant Secretary of the Navy (Research, Development, and Acquisition) and should be completed this summer.

AEGIS SHIPBUILDING PROGRAM

Congressman Saxton: In your testimony you state that the Navy is attempting to realize savings through "affordable modernization." Do you disagree with industry analyses which report that, at a procurement rate of 2.5 destroyers per year, the Navy will require an additional $2 billion to build the remainder of it's five year Aegis shipbuilding program?

Vice Admiral Lopez: The Navy is currently procuring 2.7 destroyers across the FYDP with 16 destroyers planned. Prior to this in FY94 and FY95, destroyers were procured at a rate of 3.0 ships per year and it is planned to return to 3.0 ships per year in FY1999 and out. At the rate of 2.7 ships per year, there will be an increase in the average unit cost of each destroyer, as fixed overhead costs are spread over a smaller business base, and efficiencies in material and component purchases are reduced. The cumulative affect of these costs could add between $680M and $1.7B to the planned 57 ship program depending upon when these ships are restored in the budget.

SHIPBUILDING

Congressman Saxton: The CNO has stated that given the current surface ship procurement rate contained in the FYDP, the Navy's shipbuilding and conversion account will have to increase sharply in the years immediately after the current FYDP in order to sustain a 346 ship Navy. What is the Navy's surface ship procurement rate for the period FY96-01? Given that procurement rate, what will the procurement rate necessarily be in FY02-06 if the Navy is to maintain a fleet of 346 ships? What is the estimated annual cost (in FY95 dollars) for procurement during the period FY02-06?

Admiral Lopez: The following table displays the FY96-01 Navy shipbuilding plan funded from the Shipbuilding and Conversion, Navy (SCN) appropriation. During FY96-01 the Navy's procurement rate for new construction ships is approximately 4.6 ships per year. This rate reflects both new construction submarines and surface ships because both types of vessels are included in the 346 ship fleet size. Over this same period, the Navy's procurement rate for new construction surface ships only is approximately 4.2 ships. The Navy's shipbuilding plan also includes a number of refueling overhauls, conversions, and service live extensions that also help sustain a 346 ship Navy.

FISCAL YEAR 1996 NAVY SHIPBUILDING PLAN
(SCN APPROPRIATION ONLY)

	FY96	FY97	FY98	FY99	FY00	FY01	TOTAL
NEW CONSTRUCTION							
CVN	--	--	--	--	AP	AP	--
NSSN	AP	--	1	--	1	--	2
SSN 21	1	--	--	--	--	--	1
DDG 51	2	3	2	3	3	3	16
LHD 1	--	--	--	--	--	1	1
LPD 17	--	--	1	--	2	2	5
TAGOS	--	--	--	1	--	--	1
TAGS/AGOR	--	--	--	1	--	--	1
ADC(X)	--	--	--	--	1	--	1
SUBTOTAL NEW SHIPS	3	3	4	5	7	6	28

CONVERSION/SLEP/RCOH							
CVN REFUELINGS (RCOH)	AP	AP	1	--	--	--	1
AOE SLEP	--	--	--	1	--	--	1
TAE CONVERSION	2	4	2	--	--	--	8
TAFS CONVERSION	2	--	--	--	--	--	2
TOTAL CONVER/SLEP/RCOH	4	4	3	1	--	--	12
TOTAL SCN	7	7	7	6	7	6	40

The procurement rate for new construction ships for the period of FY02-06, would be an estimate as the Navy has not yet made program or procurement decisions as to the force composition to maintain a fleet of 346 ships after the turn of the century. If an average service life of 35 years is used, that procurement rate would have to be approximately 10 ships per year in order to maintain a fleet size of 346 ships.

Using the estimated procurement rate of 10 ships per year for the period FY02-06, and using a notional shipbuilding plan that phases replacement ships and required new construction to meet projected force requirements, the estimated annual cost in FY95 dollars for the period FY02-06 is approximately $7.7B a year.

The SL7 program is comprised of eight Fast Sealift Ships (FSS) that are in a reduced operating status (ROS-4) capable of activating in four days or less. The ships are not a part of the RRF and are assigned by the Joint Staff to United States Transportation Command for employment as common user surge sealift.

Regarding the roll on/roll off issue, the sealift acquisition program is acquiring 14 U.S. built new construction ships and five foreign-built conversion ships to meet the Mobility Requirements Study of January 1992. The conversion approach was chosen because it promised earlier delivery of ships at the Army's and Joint Chiefs request (to reduce warfighting risk) and a lower up-front investment than a new construction program. A Congressional limitation of five foreign-built ships was imposed by the FY-1993 defense Authorization and Appropriations Acts. In response to a Navy solicitation, five U.S. shipyards submitted conversion proposals in March 1993 representing 16 ships, 14 of which were foreign-built/flagged. No U.S.-built/flagged ships existed that met the 24 knot, non-steam propulsion requirement. The two U.S. ships that were offered up were 22 knot, steam propelled LASH vessels that would have required reengining in addition to other extensive conversion work. Thus, foreign-built/flagged ships offered the best value in meeting the sealift military requirement. It should be noted that these conversions are not simple overhauls and are providing several hundred million dollars of work for two U.S. shipyards.

The average age of tactical aircraft will begin to increase in FY 1996. The average age of surface combatants has been increasing since FY 1992 and will continue to increase through FY 2000 and beyond. Both aircraft and ships would have a significantly higher aging factor had the Navy not retired in excess of 40% of it's ships force structure and 30% of it's aircraft.

The State of the Navy

Brief to
House National Security Committee

CY 94 Overseas Presence
(avg)

Non-Deployed
Surface Ship OPTEMPO
Highest levels since 1975

Deployed
Surface Ship OPTEMPO
Highest levels since 1986*

CY 1994
Number of ships: 395
Ships Underway: 205 (50+%)
Ships Deployed: 100 (24+%)
ARGs Deployed: 3
CVBGs deployed: 3

*Excluding Desert Shield/Storm

Need for Naval Forces--

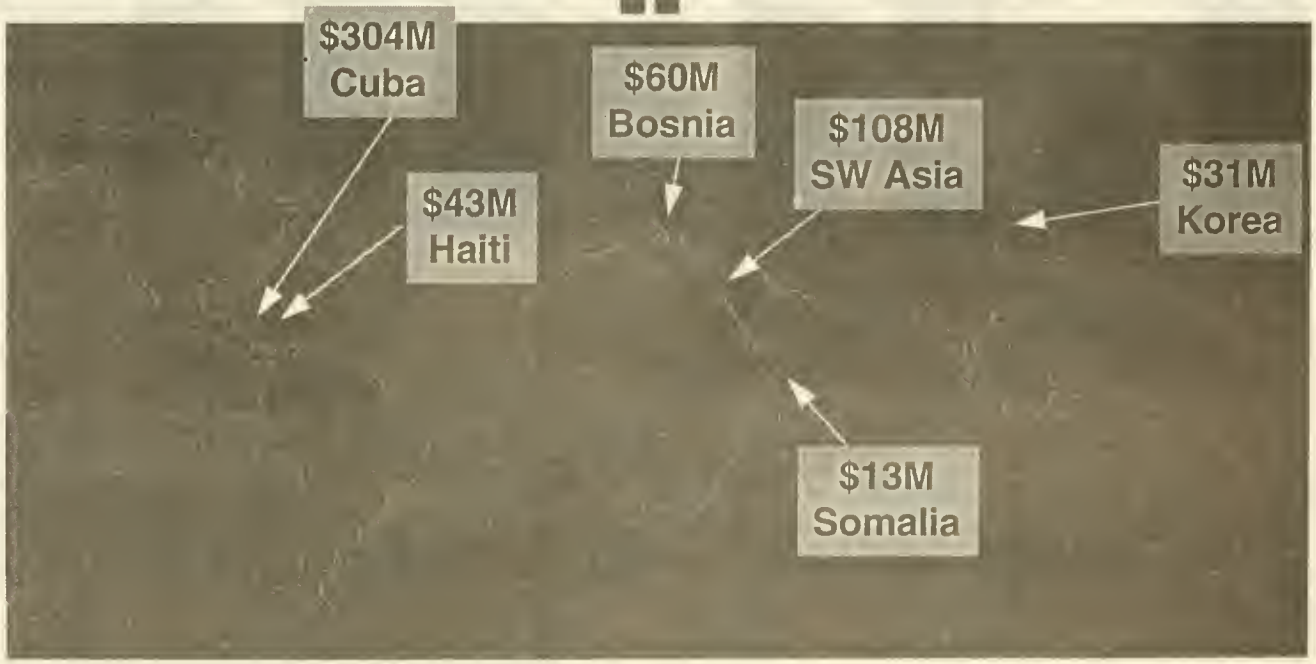
Cuba
Haiti
Somalia
Red Sea
Persian Gulf
Adriatic
Korea
Counterdrug

National Command Authority

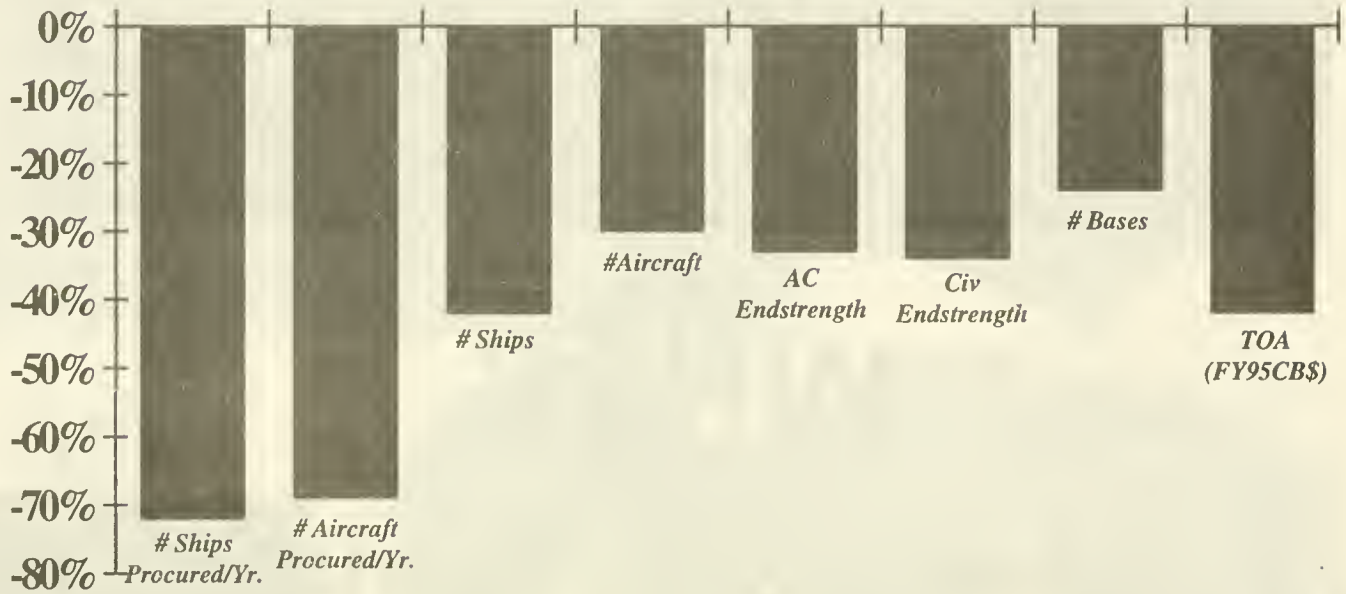
not decreasing!

Unfunded Contingency Ops

$559M



DoN Reduction Reality: FY87 to FY99



Recapitalization/Modernization...
Readiness for the Future

SSNs/CVNs

❶ **SSN 23** bridges gap to new class in FY98
❷ **New SSN** provides extensive NEW capability at lower cost (shallow water, strike, improved comms)
❸ **CVN-76** procured in FY95
❹ Sustains two nuclear shipbuilders

Surface Combatants

❶ **DDG-51** program (rqmt 3/yr) which sustains two shipbuilders and recapitalizes the force.

Amphibs

❶ Procuring **LHD-7** in FY01
❷ **LPD-17** lead ship procurement in FY98
❸ Comms/link upgrades to LHAs/LHDs: supports CJTF capability

Naval Aviation

❶ **F/A-18 E/F**
- Multi-mission; emphasis on sensors/weapons
- CVW strike cornerstone for FY02 and beyond; fills decks
- 20 yrs potential for growth

❷ **JAST**
- Development of common components for future engines, avionics, munitions...
- Naval silhouette but 80% joint

V-22

❶ Replaces aging USMC CH-46/53D force
❷ Dramatic increase in capability for Operational Maneuver From the Sea

Some of the Risks Outlined in POM-96 are Materializing...

POM-96
Met Defense Planning Guidance
Within lowering fiscal limits

Base Closure
- Costs underestimated
- Loss of revenue
- Slower pace -->greater expense

Weapons Systems
- New programs suffer severe cost growth
- Industrial base not maintained
- USMC dependency on joint programs

Inability to Recapitalize... tomorrow's readiness

Outsourcing
- Legal impediments

World conditions will require more assets

Readiness costs increase
- Unable to resist higher OPTEMPO
- Contingency Ops funding
- Personnel turbulence
- DBOF costs may increase
- Maintenance regionalization doesn't work

Future Resource Allocation Choices

- **Funding choices**
  - –Readiness
  - –Force Structure
  - –Modernization/Recapitalization

At risk : Modernization/ Recapitalization → Readiness for the Future

Forward Deployed Naval Forces... Early, Flexible, Mobile

Poised to prevent crises...ready to project combat power for conflict resolution

Question from Congressman Hunter: In prior years, the Marine Corps has previously designated the development and procurement of the Advanced Amphibious Assault Vehicle (AAAV) as one of its highest priority programs. The AAAV has been cited as key to the ability of the Corps to execute its strategy of operational maneuver from-the sea. Late last year, a Defense Department decision delayed development of the AAAV until after 2001. What is the impact of this delay? What measures are being taken in the interim and have they been supported in the budget request and future budget projections?

Answer: The AAAV is the Marine Corps number one ground program. Our requirement for the AAAV was revalidated by the expanded Joint Requirements Oversight Committee on 16 February 1995. On 15 March 1995 the Defense Acquisition Board approved the AAAV program for Milestone (MS) I Demonstration and Validation.

Program Decision Memoranda IV of 16 December 1994 reduced program funding by $189.8 Million. This reduction will slip the projected IOC of the program from FY05 to FY08. The Advanced Amphibious Assault Vehicle (AAAV) is a concept based requirement that supports the naval strategy of ". . . From the Sea", "Forward... From the Sea", and the operational concept for the projection of maritime power "Operational Maneuver From The Sea." As the third leg in the mobility triad which includes the Landing Craft Air Cushion (LCAC) and V-22 Tilt Rotor Aircraft, the AAAV will provide the Marine Corps an amphibious vehicle with the water and land mobility, firepower, survivability, and lift to fully execute all assigned missions across the entire spectrum of conflict. The next generation technology of the AAAV will provide unprecedented mobility for naval forces. For the first time, landing forces will have the capability to seamlessly transition from maneuvering at sea to maneuvering ashore, making over the horizon surface attack and ship-to-objective maneuver possible. Once ashore, the AAAV will provide the Marines with enhanced capabilities for shore-to-shore, riverine, and shore-to-ship movement.

As the primary surface vehicle for ground combat and for all contingencies short of combat, the AAAV will provide the Marines significantly enhanced armored protection, lethality, and NBC defense. The mobility, speed, firepower, and survivability of the AAAV affords naval forces the flexibility and versatility to operate more effectively in the increasingly chaotic littorals of the 21st Century. From lower intensity missions currently viewed as Operations Other Than War, such as humanitarian assistance, noncombatant evacuation operations, and peacekeeping or peacemaking, to the higher intensity missions of the amphibious assault and ground combat ashore, the AAAV will provide the Marines a dramatic increase in capability over the current AAVP7 which reflects 1960 technology. The AAAV will be one of the most advanced and capable weapon systems in the world. Coupled with the V-22 and the LCAC, the AAAV will provide United States naval forces the full range of capabilities to exploit our technology superiority.

The current capability of the AAV7A1 will be maintained through a funded Product Improvement Program. Although delayed, the AAAV program remains healthy - - a Milestone II DAB is planned for FY 2002; a Milestone III full rate production decision is expected in FY 2008; and Full Operational Capability is planned for FY 2014.

Question from Congressman Hunter: The Marine Corps Commandant recently identified ammunition as one of the highest priority items that he would address with any additional funding that might be available. Does this indicate that the Marine Corps has immediate concerns about the impact of reduced levels of ammunition procurement?

Answer: The Marine Corps is concerned with our current level of ammunition procurement. Based on changes in force structure and Defense Planning Guidance (DPG), our ammunition requirements changed between POM 94 and POM 96. For POM 94, our ammunition requirements were programmed for an end-strength of 159K active and 34.9K reserve. The DPG at that time stipulated 45 days of ammunition for sustainment. By POM 96, our structure was programmed at the current 174K active and 42K reserve level. In addition, DPG96 increased the amount of War Materiel Requirements (WMR) for ammunition from 45 to 120 days. Current requirements provide for critical munitions to "fight and win" two Major Regional Conflicts (MRCs). Proper ammunition inventory management and acquisition requires long-lead planning in order to achieve the most economical order of buy. Given current readiness requirements in training and WMR needs, the Marine Corps has an overall ammunition shortfall. By drawing down the war reserve inventory, we will be able to conduct the training required in FY96 to maintain desired readiness levels. This drawdown will exacerbate the Marine Corps' ammunition shortfall in meeting DPG96 requirements.

Question from Congressman Chambliss: One of the overlooked aspects of our procurement authorization each year seems to be the military need for heavy trucks. I am concerned that while we may focus on the high-tech advanced weapons systems, we overlook the need to move the equipment quickly and safely to where our military men and women need them the most. To this end, both the Marine Corps and the Army seem to have raised the priority for replacing their current fleets of trucks. Can you briefly outline the Marine Corps concept for meeting its requirements and give us the particulars of the program?

Answer: The Marine Corps' management strategy for our fleet of tactical motor transport vehicles is tied to their service life expectancy. We will modernize our current tactical vehicles through upgrade and remanufacture, the Medium Tactical Vehicle Remanufacture (MTVR) program. This program will increase the service life of our current fleet of vehicles, enhance mobility, and improve Reliability, Availability, and Maintainability (RAM). Our Cost and Effective Operational Analysis has concluded that a remanufactured vehicle will cost of $97,000 versus the projected cost of $138,000 for a new vehicle, a thirty percent cost avoidance.

The MTVR program will remanufacture our entire medium tactical vehicle fleet. This effort is planned to coincide with the expiration of the economic useful life of our current vehicles. The remanufacture will incorporate many technological improvements - - improved drive train, central tire inflation system, and an independent suspension are salient examples. These enhancements will increase both the cross country and cargo capability of our medium truck fleet without increasing the strategic lift footprint. This program is planned for a MS I/II decision in May 1995.

For FY96, $2.4 million is budgeted in R&D; for FY99-01, $262 million is programmed for procurement.

SURFACE COMBATANTS

Congressman Hunter: Has the Navy increased the number of surface combatants it forecasts for the 346-ship fleet? If so, why and by how many?

Vice Admiral Lopez: Yes we have. Defense Planning Guidance, FY 1996-2001 directed the Navy to program for "about 110-116 major surface combatants plus approximately 10 Naval Reserve frigates." Results of a recently completed Surface Combatant Force Level Study (SCFLS), initiated by the Surface Warfare Directorate, determined for a two, near simultaneous, MRC scenario, 165 surface combatants are required. We would rely on coalition forces to provide approximately 20 of these ships. The remaining 145 ship requirement would consist of 135 active and 10 Naval Reserve.

Congressman Hunter: If there are to be 135-140 surface combatants in the fleet, each with a 30-year life, the Navy should be buying about 4 1/2 new ships each year. If we are only buying 2 2/3 destroyers over the next six years, what does this portend for the future?

Vice Admiral Lopez: Navy's proposal is to delay decommissioning fifteen FFG-7 class ships across the FYDP to attain a surface combatant force structure of 130 active and 8 Naval Reserve ships by FY01 using a 35yr service life for surface combatants. Neither the FYPD shipbuilding plan nor the extended plan for surface combatants supports a 135-140 force structure in the out years. This could portend a ship building bow wave for the future when the FFG-7s and DD-963s are decommissioned in the 2008-2013 time frame. A Force Architecture Study, commissioned October 94 by the Surface Warfare Directorate, will analyze the force structure required to meet the projected threat (2008-2038), affordability options, and various force structure alternatives.

PROCUREMENT

Congressman Hunter: Why did the Navy decide to forego procurement of two previously planned destroyers, one in FY1996 and one in FY1998? Does this have anything to do with fully funding an SSN 23 in FY1996 and a new attack submarine in FY1998?

Vice Admiral Lopez: No, DDG-51 was cut in FY's 1996 and 1998 by DEPSECDEF Program Decision Memorandum, IV, dated 16 December 1994 to help fund higher priority programs affecting military pay, readiness and quality of life. The modernization changes are part of a package of FY 1996-01 defense budget decisions consistent with the priority that President Clinton and Secretary Perry have placed on readiness and on people in the U.S. Armed Forces. SSN 23 and the New Attack Submarine are top priority programs in the Navy's modernization efforts and are fully funded.

Congressman Hunter: What activities are being undertaken by the Navy to ensure a viable business environment for its shipbuilders and vendor base?

Vice Admiral Lopez. Since the end of the "Cold War" and the subsequent fleet downsizing, the Navy has been concerned about the viability of the shipbuilding industrial base. The Navy has and continues to conduct studies to identify those capabilities which are in jeopardy of being lost as a result of the reduced procurement rates of Navy ships. The Navy has recognized the need to maintain specific capabilities, such as nuclear shipbuilding and warship design and construction, which are unique to Naval shipbuilding. To ensure the preservation of these unique capabilities the Navy has implemented several actions, including the following:

Submarines

The Department of Defense Bottoms-Up Review concluded that it was advantageous to maintain two nuclear capable shipyards, and to take action to maintain the nuclear submarine construction industrial base. Congress had earlier supported maintaining the submarine construction industrial base by appropriating $540M. in FY 92 for that purpose.

To support these policies, the Navy has:

* Awarded Newport News Shipbuilding (NNS) a contract for the construction of the CVN 76 nuclear powered aircraft carrier, thereby maintaining NNS' skilled nuclear workforce and nuclear vendor base into the next century. This action assures continual operation of CVN for NNS and submarines for Electric Boat Division of General Dynamics (EB);

* Awarded EB long lead material contracts for submarine vendor items to protect the schedule for future submarine construction and maintain critical submarine vendor capabilities;

* Awarded research, development and design contracts to EB to maintain its capabilities for submarine design and construction, and to design and prepare for the construction of the New Attack Submarine;

* The Navy has awarded other contracts to critical submarine vendors for hull machinery, propulsion items and electronic systems to maintain the industrial base.

In addition, the Navy recommends the construction of an additional SEAWOLF class SSN at Electric Boat in FY 96 to help "bridge" the projected gap in submarine production between the SSN 22 and NSSN program and ensure the viability of the submarine industrial base.

DDG 51 Class Destroyers

The Navy, concerned that the two DDG 51 class destroyer shipyards would engage in agressive competitive pricing for the FY 94 and FY 95 DDG 51 class ships decided to allocate the work between the two yards. This acquisition strategy minimized acquisition risk to the Navy for these ships by eliminating the potential for award of contracts at unrealistically low prices, which often create undesirable effects, and allowed time for study and development of Navy planning for future DDG 51 ship acquisitions. This was a departure from the past practice of competitively procuring DDG 51 class ships and was the initial step in a strategy to determine and implement those actions the Navy needs to take to maintain a healthy production base for surface combatants. A complete review of the DDG 51 class acquisition strategy which will include an independent industrial base analysis has been initiated. Its objective is to develop a long term strategy for acquisition of surface combatants.

Other Activities

Provided below are other activities, initiatives, and endeavors which the Navy has or is currently undertaking to preserve and ensure an active and viable shipbuilding/vendor environment:

1) ASN (RD&A) conducted a thorough review of shipbuilding, aircraft and vendors industrial base under its Program Review for FY 97 (PR 97).

2) Mil-Spec Reform - This new program is expected to eliminate unnecessary reliance on military specs and standards.

3) Use of performance based specifications, commercial specifications, and non-government standards.

4) ISO 9000 approved for use as a QA standard.

5) Affordability Through Commonality (ATC) program - initiated to produce more affordable ships by reducing acquisition and in-service costs.

6) Extended utilization of commercial off the shelf (COTS) items.

7) Allowing private yards to compete for depot repairs.

8) Increased reliance on the private sector for maintenance and research and development.

9) Using split design concepts as done with Newport News and Electric Boat for the SSN 21 class submarine.

10) Force level reductions bringing maintenance work back from overseas.

The Navy continually monitors the Shipbuilding Industrial Base and provides periodic assessments of the base, highlighting problem areas. These analyses provide a tool by which the Navy can institute appropriate measures to ensure a viable business base.

AEGIS CRUISERS

Congressman Hunter: What are the Navy's intentions regarding modernization of the first five AEGIS cruisers? Given the relatively young age of these ships (the oldest is now 12), the high cost of procuring them (more than $1 billion each in today's dollars), and their current relatively narrow mission capabilities (no Tomahawks and no potential for theater ballistic missile defense (TBM) capability), wouldn't it be cost-effective to backfit these ships with vertical launch tubes and modernize their combat systems to make them TBM-capable?

Vice Admiral Lopez: The first five AEGIS cruisers, CGs 47-51, will continue to receive hull, maintenance, electrical, and combat system improvements over their projected service lives. These ships are, and will remain, quite capable warfighting platforms for missions including, but not limited to, air defense, surface warfare and anti-submarine warfare. Backfit of these ships to incorporate vertical launchers and combat system modernizations is feasible but neither cost effective nor affordable. The major component of such a backfit would be replacement of the existing MK 26 Guided Missile Launching System with the MK 41 Vertical Launching System (VLS). Because these ships are at or near their weight and moment (stability) limitations, significant hull form and structural modifications would be required to accommodate the VLS. Cost for these modifications is estimated at greater than $100 million per ship. Radar, computer and display modifications would be required to support a TBM capability, adding signficant additional cost per ship to such an upgrade.

Congressman Hunter: What is the Navy's current requirement for SH-60B or SH-60F aircraft? Is this requirement fully funded in the six-year budget? If not, why?

Vice Admiral Lopez: The Navy has sufficient SH-60F inventory to meet projected requirements. HS squadron composition (PAA) has been reduced from a total of eight aircraft (6 SH-60Fs + 2 HH-60Hs) to five aircraft (3 SH-60Fs + 2HH-60Hs). A further reduction of HS squadron size will occur in FY 2002 time frame when the composition will become four HH-60Hs. These reductions were possible as a result of the diminished ASW threat to naval forces and the increased numbers of LAMPS MK III (SH-60B) helicopters now present in the carrier battle group.

The SH-60B requirement is fully funded in the Future Years Defense Program. During the FY 1995 budget development process, the Navy's procurement objective for LAMPS helicopters was reduced to 181, from an initial proposal of 202, in anticipation of a future decline in the number of helicopter capable surface combatants. While fewer dual aircraft detachments will be fielded due to the reduced SH-60B inventory, all LAMPS MK III surface combatants will continue to receive LAMPS detachments for all underway operations.

Since then, however, Navy surface combatant force level requirements have increased. Therefore, I have commissioned a study to review Navy helicopter force level requirements. The results of this study, which are due in the fourth quarter FY 1995, will assist the Navy in making future decisions as part of the continuing review process of this program.

Congressman Hunter: In your statement, you indicate that you have reduced your aircraft force structure by 31 percent since 1987. Would you please provide the details of those reductions, by aircraft type, while also providing the plan for the FYDP, by aircraft type (for the Navy and Marine Corps)?

Vice Admiral Lopez: DoN force structure reductions representing a 31 percent decrease for the period of 1987 through 1996 and projected force structure break out by Navy and Marine Corps thru the FYDP are contained in enclosures (1) and (2).

FORCE STRUCTURE REDUCTIONS

NAVY

	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04
VFFA	276	281	342	396	443	478	492	493	483	495	510	536	518	496	474	448	423	395
VF	474	467	472	498	496	510	477	436	334	312	268	269	266	261	258	254	250	250
VA	750	720	690	657	542	521	472	270	190	190	100	98	98	98	98	98	98	98
VS	156	153	152	158	154	127	122	120	119	119	119	118	117	118	115	119	119	119
VP	391	385	382	357	346	333	318	264	248	237	235	237	236	237	237	237	237	237
VW	132	127	144	152	152	186	160	144	127	126	127	126	126	127	126	126	127	126
VR	94	98	103	103	103	102	106	108	104	103	103	95	93	93	92	91	90	90
VG	4	5	8	8	7	5	1	2	1	1	1	1	1	1	1	1	1	1
VO	8	7	25	12	3	0	0	0	0	0	0	0	0	0	0	0	0	0
VU	79	93	93	94	90	98	90	88	84	84	83		84	84	84	84	84	84
VT	937	909	958	968	924	807	660	599	614	592	597	589	580	572	564	570	587	578
H	727	753	773	800	842	783	720	690	677	679	668	667	653	656	653	654	668	668
TOTAL	4028	3998	4140	4203	4102	3930	3616	3214	2985	2911	2814	2736	2774	2743	2703	2683	2684	2648

MARINE CORPS

	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04
VFFA	91	118	161	208	237	248	274	268	334	334	334	301	301	301	301	301	301	301
VF	118	102	49	40	28	13	13	13	13	13	13	13	13	13	13	13	13	13
VA	285	289	293	286	269	225	200	190	177	177	177	177	177	177	177	177	177	177
VR	7	7	7	7	7	8	7	5	5	5	5	5	5	5	5	5	5	5
VG	59	59	57	84	85	89	74	74	74	74	74	74	74	74	74	74	74	74
VO	79	73	51	51	49	38	9	0										
VU	16	18	17	18	18	18	18	15	15	15	15	15	15	15	15	15	15	15
VT	31	27	21	23	24	25	23	18	18	14	15	14	14	14	15	14	14	14
H	706	680	700	707	669	690	681	695	713	716	720	716	716	728	725	725	725	723
TOTAL	1391	1353	1358	1402	1385	1330	1309	1278	1347	1350	1353	1315	1315	1327	1325	1324	1324	1322

T/M/S

STRIKE FIGHTER	VFFA	F/A-18A, B, C, D, F	
FIGHTER	VF	F-14 A, B, D	
ATTACK	VA	A-6E EA-6A, B	AV-8B
ANTI SUB	VS	S-3A, B	
PATROL	VP	P-3B, C	
WARNING	EW	E-2C E-6A	ES-3A
TRANSPORT	VR	C-20 C-2A C-9 LC-130	C-130T VP-3A CT-39
IN FLIGHT REFUEL	VG	KC-130	
OBSERVATION	VO	OV-10D	
UTILITY	VU	C-12 UP-3A UP-3B	U-1 U-6
TRAINING	VT	T-2 T-34 T-44 T-45 TA-4J T-39 JPATS	TE-2 TA-7 T-38 TC-4C TC-130 TP-3A TAV-8B
ROTARY WING	H	AH-1W HH-1N UH-1N UH-3H CH-46D, E CH-53E MV-22	SH-60B, F HH-60H SH-2F, G SH-3H MH-53E RH-53D

4/7/95

Congressman Hunter: You are procuring 12 aircraft this year. What rate is required to sustain the Navy and Marine Corps bottom up review force structure?

Vice Admiral Lopez: Ideally the Navy would like to replace older less capable aircraft with newer models. This would require the purchase of an additional 36 aircraft in FY 1996 and FY 1997. However, the realities of fiscal constraints were the driving force behind the reduced procurement decision. The Navy was faced with difficult affordability issues during the FY 1996 Budget Development process. After careful analysis of F/A-18 requirements, the Navy felt that 12 aircraft in FY 1996 would provide the fleet with the operational and training capability required until delivery of the F/A-18E/F.

In order to sustain tactical aircraft inventories through 2015, total tactical aircraft procurement must ramp up to approximately 70 aircraft per year by 2004 to sustain the force structure outlined in the Bottom Up Review.

Congrsessman Hunter: If the primary mission of the Navy and Marine Corps fighter/attack aircraft is forward presence and littoral warfare, with the ability to focus assets on that mission, why does the Marine Corps need an AV-8 replacement? As you point out in your statement, 80% of the world's population is within 200 miles of the sea. When you are 10 to 20 minutes maximum away from your potential area of operation in an F-18, why do you need AV-8 capability?

Vice Admiral Lopez: Marines will tell you that there are situations in which 20 minutes is simply too long, a lesson they learned in Vietnam. In fact, they've endeavored to achieve routine response times of under 10 minutes. That's how critical they believe it is. Marines also know that there will be times when high surge rate Close Air Support will be required.

In order to do that, we have to be able to base as close as feasibly possible to the forward line of troops (FLOT). The net result of being close can be measured two ways: response time and sortie generation. This may come from an amphibious deck operating close to shore, it may come from a captured or damaged airfield, or it may be even a highway or grass strip. The AV-8B Harrier is the most 'basing-friendly' tactical jet in the United States inventory as evidenced by its versatility in the last war. In DESERT STORM we were able to 'shoehorn' 86 more tactical aircraft into theater; aircraft for which there was no room at traditional airfields. We did this when we operated 66 AV-8B's from a soccer stadium and based 20 more aboard USS NASSAU.

I view the capabilities of the Hornet and Harrier as complimentary, not competitive. Littoral means that we can project power ashore by using the sea as a seamless avenue of approach. Aircraft such as the Harrier allow innovative ways to support our forces ashore without restricting the CINC's courses of action. Because they can launch and recover from almost anywhere, for example, we can originate a mission from sea bases, rearm and refuel it from a forward site, and return it to its sea base, or we can phase it ashore as necessary.

Finally, your question dealt with the necessity of replacement. As a result of normal attrition, the Harrier will begin to go below our warfighting requirement as early as 2003. The Marines plan to replace both this aircraft, as well as their own F/A-18s with a variant of JAST called ASTOVL around the same time. The ASTOVL aircraft will be innovative in that it will merge the latest in aircraft technology with the capability to land vertically. This will complete the 'neckdown' plan the Marines embarked upon in the late 1970s; a plan to achieve efficiencies by relying upon fewer, but more capable type/model/series aircraft.

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March 31, 1995

The Honorable Duncan Hunter
Chairman, Military Procurement Committee
Committee on National Security
US. House of Representatives
Washington, D.C. 20515-6035

Modernization and the Defense Industrial Base

Dear Mr. Hunter:

Pursuant to your request in your letter dated March 15, 1995, I am writing to provide responses to the additional questions submitted by you and Congressman Ortiz for your consideration in connection with the fiscal year 1996 defense budget request.

As the Society indicated in its written and verbal testimony presented at the March 7, 1995 hearings, continued investment in helicopter production and research and development programs is required in order to maintain a US industrial base capable of meeting future national security requirements in a timely and cost-effective manner. With the industry's leading military helicopter programs, e.g., the Bell AH-1W and OH-58D; the Sikorsky UH-60L, SH-60B and CH53E; the McDonnell Douglas AH-64A; and the Boeing CH-47D, all of whose funding will end during the 1996-1997 period, the US industry will become wholly dependent on international military sales in order to maintain its key production lines. International competitors, meanwhile, are bringing new advanced helicopter systems to the market in quick succession, including the EH-101, the NH-90, the Tiger, and the Mi-38. By comparison, the US industry has only a single production program, the V-22, during this period. If US manufacturers are to remain competitive in international markets, therefore, the US government and industry must make substantial additional investments in next-generation technologies, processes and systems significantly above and beyond what is now planned.

Question 1. What is the impact of shutting down the only helicopter program in production? Currently, there are several helicopter programs in production, including the UH-60L (funds requested in the FY96 budget); AH-1W (funded in FY95); OH-58D (funded in FY95), AH64 (funded in FY95; but funding for FY96

currently rescinded); and the CH-47D (funded in 1995). The V-22 Osprey has been approved for production, and the RAH-66 Comanche, while not funded for production, has been funded for DemVal at the $2.1 billion level during the next five years. The AH64D Apache Longbow, which is funded in FY96 and the POM, represents an upgrade to existing AH-64 airframes. In addition, there are several commercial production lines, including the MD500 and Explorer series; the Sikorsky S-76 and S-70; the Bell 206, 230/430, 212, and 412 production efforts. With the exception of the V-22 and Apache Longbow, however, all of the US military production programs are not funded beyond the 1996-1997 time frame. These programs must be considered in connection with the US rotorcraft industrial base.

Question 2. With no foreseeable new helicopter production except for the V-22 tiltrotor, will the industry be able to ramp up to the bow wave of new production, upgrades, and service life extension programs anticipated 10 to 15 years from now? Without a continuing base of existing military production (AH-1W, UH-60, OH-58D, CH-47D, AH-64, RAH-66, V-22, and the like), the industry could experience significant delays as well as potential cost increases in any future ramp up for new production, upgrades and service life extension programs. Production of advanced helicopters at an affordable level is essential for the US industry to retain defense industrial expertise and mobilization/surge capabilities to meet national security requirements.

Question 3. What vendor base components are jeopardized by the cessation of new helicopter production? The gear manufacturing industry, which is highly dependent on helicopter production, would probably lose one or more of the current limited supplier base. The forging press capability within the US, highly dependent on fighter aircraft and helicopter production, is already severely compromised. Additional areas that might be impacted would be aerospace forging and composite industries which produce specialty materials such as steels and composites that are primary to the helicopter industry, as well as dynamic component grade titanium and aircraft bolts and fasteners manufacturers. Some suppliers are sufficiently diversified between military and commercial products that any impact would be limited to start-up delays in the event of new production starts. In all events, the loss of production business would limit prime contractors' leverage with these suppliers to invest in further advancements and development in their expert areas. The loss of this leverage could potentially impact system performance and technological competitive advantages.

Question 4. What is the outlook for foreign military sales and commercial sales in the near term? What happens if the international market does not materialize? (Congressman Ortiz asks a related question, what impact does

foreign military sales have on the ability to preserve the industrial base and keep important skills and production lines available?) Forecasts for international military sales by US manufacturers (both FMS and direct sales) vary substantially, and experienced industry analysts question whether such sales will approach half of the $900 million annual level predicted by DOD in its forecast (*World-Wide Conventional Arms Trade: A Forecast and Analysis*, DOD, December, 1994). Civil helicopter sales have been flat in recent years, down from their resource development-driven sales highs in the early 1980s. Slow growth in civil sales of about four to five percent per year (in dollar terms) are forecast over the next ten years. However, civil sales, predominantly light helicopter production, have approximated only 20 percent of market value, and cannot offset industrial capacity or key technologies for military advantage.

International military sales are expected to average more than 20 percent of the average US sales revenue for the next ten years. This is an extremely important component of the US defense industrial base, in particular since the major US helicopter production lines which have sustained the US industry in recent years are now ending. Consider that between 1996 and 1997, the OH-58D (Kiowa Warrior) and AH-1W (Supercobra), CH47D (Advanced Chinook), AH64 (Apache), CH53 (Sea Stallion), UH-60L (Black Hawk) and SH-60B (Seahawk) current funding is projected to end. Only international military sales or continued US military procurement will sustain these important production lines. The continued health of the US industrial base depends to a considerable extent on industry's success in international military sales.

Continued success in international markets cannot be assumed. European helicopter manufacturers are now focusing political capital to enhance overall competitive advantage in foreign procurements. European countries, all members of the EEC, are driven to purchase only European products. Accordingly, it is imperative that the US have a policy framework that ensures the maximum "leveling of the playing field." Congress, the US Department of State, DOD and other government agencies must provide expeditious, pragmatic review of such barriers as technology transfer and geographic limitations, R&D recoupment, licensing and aircraft leasing limitations and the like.

Question 5. Is the DOD's decision to forego production of the Comanche an attempt to force consolidation of the industry? The rotorcraft industry will assess consolidation options and timing in light of business objectives, strategic positioning, and restructuring strategies relative to private sector performance measures and total customer requirements, not on a single program's year-to-year uncertainty.

The Honorable Duncan Hunter
March 31, 1995
Page 4

Question 6. Is the Longbow modification program sufficient workload to preserve the Apache industrial base? The Apache Longbow program is a modification program. Accordingly, the work content on Apache Longbow aircraft is substantially less than complete production needed to sustain the industrial base. MDHS expects to maintain core Apache production capability. The most significant industrial base problem will occur at the subcontractor level, e.g., the airframe producer. The Apache is predominately a "purchased parts" aircraft, and the survival of key subcontractors is at risk without new production.

Question 7. What is the impact on the industry if DOD sells or transfers thousands of surplus military helicopters on the open market? The impact on the US rotorcraft industry would be severe since the planned disposition of thousands of surplus aircraft by the Army will clearly displace sales in the 1996-2000 period of helicopters, helicopter engines and spare parts in FMS, public service and commercial and international markets. In addition, the disposition of surplus aircraft will raise major product liability issues. Helicopter manufacturers are key to the maintenance of an industrial base that is capable of meeting future national security requirements in a timely and cost-effective manner. Their weakening would diminish the industry's ability to meet future defense needs.

Question 8. Can the industry survive without US military helicopter production? Without US military helicopter production, the US rotorcraft industry cannot retain the total know-how or technical edge to respond to changes in the uncertain global national security environment. IR&D and civil production programs are not sufficient to maintain this real world defense competitive advantage.

On behalf of the US rotorcraft industry, the American Helicopter Society thanks you and the members of your committee for the opportunity to respond to your questions regarding modernization and the current state of the rotorcraft industrial base. Should you or your fellow members or staff members have further questions, please do not hesitate to contact me.

Very truly yours,

M.E. Rhett Flater
Executive Director

QUESTIONS FOR MR. HARDISON

Questions From Congressman Hunter

● Faced with the total zeroing of small arms procurement in the FY 96 and FY97 budget requests, how will the small arms industry maintain itself?

The question is taken to refer mainly to the three major producers of military small arms--commercial firms having obligations to protect shareholder interests. These firms are seeking to remain viable by measures such as plant-wide cost-reduction efforts, consolidation of facilities, reduction of work force, sale of arms to other customers and transition of facilities, equipment, and personnel to the production of commercial items. They want to provide, but generally have not provided, repair parts and they want to overhaul and improve fielded arms. The ability if these firms to promptly resume production of military small arms, if indeed the firms survive, will depend on the similarity of work of arms production and the work they do to remain viable. For the posited case, industry's capability to promptly resume high-rate production of small arms probably would not be maintained.

● Will critical elements of the industrial base capability disappear? If so, when?

One should first be clear about the matter of criticality; it arises in two different ways. The first concerns assets whose preservation is essential if the capability to produce small arms is to be retained. The second, more judgmental, concerns the importance of preserving the industrial base and the extent to which, considering value and affordability, base preservation is warranted. In the second case, the answer depends in large measure on unknowns--the time and size of future demands for current arms. So, here, judgements can differ.

As a practical business matter, elements of the industrial base, including skilled workers and specialized production equipment, that would have to be preserved to retain a capability for prompt production of military small arms, would disappear concurrent with the exhaustion of production funds. Reacting to current funding and prospects for future production, the industrial firms already are reducing personnel and facilities and changing the use of equipment.

If no production funds are provided after FY95, most of the military small arms production base probably will disappear in two-three years. Thereafter, a new base capable of producing military small arms presumably could be reconstituted when needed by paying the price for facilities, equipment, and re-acquisition of personnel skills. High-rate deliveries could first occur only after a delay estimated to be two to three years after re-start, depending on the production complexity of the arm.

For small arms now available in excess quantities and ones of marginal future utility, the consequences of the projected production lag time may not be critical; for others, the delivery lag time and re-start costs may be of more concern.

● Are there alternatives that could be explored to maintain a viable small arms industrial base?

Yes. The Panel of the Army Science Board provided a number of alternatives for preservation of critical elements of the small arms industrial base. Two of those alternatives could be explored.

The first alternative would have the Army competitively select two industrial firms to produce limited quantities of arms now available in less-than-required numbers, produce repair parts, provide product improvements, overhaul unserviceable arms returned from field use, and, possibly, re-manufacture of fielded arms--all work that will need to be done and which could be managed so as to preserve a meaningful production capacity. The manufacture of repair parts and overhaul of unserviceable arms by firms preserving the base, as contrasted to the current practice of using small businesses and Army depots, would minimize the overall costs of a small arms program that preserves the base, but doing so would be a change in the way the Army has supported small arms in the past. The Army Science Board Panel viewed this change as warranted in today's environment.

The second alternative would not change the traditional source of repair parts or arms overhaul and would have the Army competitively select a single firm for actions to preserve critical elements of the base, to include limited production of arms now available in less-than-required numbers. As discussed in the Statement provided to the Committee earlier, this alternative is less attractive in a number of ways than that described above. It appears to be warranted only if the traditional way of supporting small arms is to be not changed.

Execution of either of these alternatives would require funds not in the Army's budget request.

● Has the industry formally offered any solutions to DOD to avoid loss of future capability?

Not on an industry-wide basis. Individual firms have committed to continued commercial diversification, cost reduction, quality improvement, and cost-efficient down-ramp of production rates. These initiatives promise to ease the transition to reduced production of military arms, but they will not preclude loss of future production capability, absent future production funding.

● What are the prospects for foreign military sales?

On the whole, not very promising. The foreign small arms market is highly competitive. It increasingly includes offset obligations. Quality small arms that are, at least, price-competitive with US small arms are produced in several countries, and potential customers often desire in-country capability. To some extent, the DOD with its large stocks of earlier small arms, including ones in less than grade A condition, competes with industry attempts to sell new arms.

There are a few case where US arms appear to have a competitive near-term market position. These are the M19 Grenade Machine Gun, the M249 Squad Assault Weapon and, perhaps, the M240 machine gun.

Lockheed
Fort Worth Company
P O Box 748, Fort Worth, Texas 76101

3 March 1995

Mrs. Colleen A. Preston
Deputy Under Secretary of Defense (Acquisition Reform)
3610 Defense Pentagon
Washington, D.C. 20301-3610

Mrs. Darleen A. Druyun
Principal Deputy Assistant Secretary of the Air Force (Acquisition and Management)
SAF/AQ 1060 Air Force Pentagon
Washington, D. C. 20330-1060

Dear Mrs. Preston and Mrs. Druyun:

For over a year, Lockheed Fort Worth Company has been studying the feasibility of the broad application of commercial practices to its military aircraft business. We are, of course, well aware of, and support Secretary Perry's initiative to reduce the use of military-unique specifications, and of the designation in the Federal Acquisition Streamlining Act of several "streamlined" defense acquisition pilot programs. We are participating in the Reinvention Laboratory to address reduced oversight; however, we challenged ourselves to go beyond those efforts. We insisted upon an aggressive self-examination to identify additional ways in which far-reaching application of commercial practices could enhance the affordability of the F-16 aircraft.

We have concluded that commercial practices can be applied extensively and successfully to our core F-16 business and that both the Government and Lockheed would realize substantial benefits if we make this change. Our planning to date suggests that reductions in the range of 15% are possible in manufacturing costs associated with the price of new F-16 aircraft and related support. These procurement savings would be accompanied by substantial reductions in the Government staff required to oversee current procurement. At the appropriate time, these same commercial practices, having been proven on the F-16 Pilot Plant program, could be applied to F-22 production and other future aircraft programs with similar cost savings.

In addition to these Government price benefits, Lockheed will improve its ability to compete with foreign aircraft manufacturers for foreign sales of the F-16. We also hope to achieve efficiencies to a degree that would make Lockheed competitive in pursuing new manufacturing business outside its traditional military hardware markets. In combination, these factors will enhance efforts to preserve the military aircraft industrial base with reduced Government outlays.

The broad application of commercial principles represents a significant opportunity for the Department of Defense to implement improvements in acquisition processes across all DoD programs. Therefore, we suggest that the Office of the Secretary of Defense assume the leadership and sponsorship of the Pilot Plant concept and coordinate with the services for designation of specific nominations.

I am convinced that Lockheed Fort Worth Company (Air Force Plant No. 4) is the ideal location to test the Pilot Plant concept. Our extensive history of F-16 production, together with the Government's existing knowledge of that product and of the processes we use to produce it, will permit us to test the comprehensive application of commercial practices to a proven baseline with lower risk than other potential large scale commercialization alternatives.

Accordingly, we specifically propose that OSD, in partnership with the Air Force, nominate Lockheed Fort Worth Company and selected suppliers under the statutory pilot program provisions as a "Fighter Aircraft Pilot Plant Program" to test the broad application of commercial practices to the procurement of military aircraft on a plant-wide basis. Lockheed will guarantee a price reduction of 15% on the manufacturing portion of the F-16 aircraft program for new orders placed after 1 May 1996, or date of complete conversion, whichever is earlier. This price reduction will be established from the latest contract prices, subject to adjustments for economics, delivery rates, quantity and configuration changes. Reductions in price for work in progress will be determined during the transition phase. In addition, LFWC will strive to reduce the price of the supplier portion of the programs (including all current GFE) by a similar 15%. We also anticipate that new aircraft delivery spans can be significantly reduced under this initiative. This offer is based upon full implementation by the Government of the attached nomination package, dated 21 February 1995.

We are enthusiastic about the unique opportunity the Government and Lockheed have to demonstrate the viability of this far-reaching revolutionary reform initiative. We propose that Lockheed and the Government immediately establish a joint integrated team to begin top-down implementation of Government oversight reductions that can now be made due to directions contained in current acquisition reform regulations and public law. In addition, the joint team should begin the detailed planning and execution required to effect the conversion. Our Lockheed Fort Worth Company team has been established and is available to begin this important joint transition coordination process.

Sincerely,

Gordon R. England
President

3 March 1995

SUMMARY OF OFFER

Lockheed Fort Worth Company
Commercialization Proposal Groundrules and Assumptions

Our proposal for nomination of Lockheed Fort Worth Company as a Fighter Aircraft Pilot Plant Program for F-16 aircraft production and selected support is based upon the following groundrules and assumptions:

Full implementation in total of the Lockheed Fort Worth Company commercialization proposal for a Pilot Plant initiative for F-16 production, including, but not limited to:

A. U. S. Government initiation of enabling legislation giving the Secretary of Defense authority to conduct the Pilot Plant Program and designating Air Force Plant No. 4 and selected supplier plants as Pilot Plants.

B. Elimination of U.S. Government oversight from applicable portions of the Pilot Plant.

C. Creation by the U. S. Government of a Pilot Plant Acquisition Executive Office with contractual authority and establishment of an impartial Executive Oversight Group.

D. Transfer of GFE contractual responsibilities to CFE.

E. Conversion of all LFWC production contracts in existence on 1 May 1996, or date of complete conversion, whichever is earlier, from FAR/DFAR procurement regulations to commercial contracts containing Uniform Commercial Code (UCC) Terms and Conditions.

F. Waiver of notification to and approval by U.S. Government of changes to LFWC Disclosure Statement.

G. Execution of an advance agreement recognizing the allocability and allowability of LFWC indirect costs associated with internal restructuring (through full conversion) to current and future contracts at LFWC.

March 31, 1995 Response to
Questions posed by
Congressman Duncan Hunter
In 15 March 1995 letter
To Gordon R. England

QUESTION: Regarding your concerns on maintaining a design and industrial base, you cite the reduction in industry employment, increasing average age of employees, and loss of critical skills. Does the industry really know enough about the character of the industrial base for fighter/attack aircraft to make a judgment about when will we reach the precipice on loss of industrial capabilities?

RESPONSE: No, we do not. Unfortunately, the many variables that enter into this equation do not lend themselves to plot a definitive "curve" from which a precipice might be identified. The subjective answer that I would offer is that the industry does know enough about this issue to offer an educated opinion. We are probably close to that precipice today.

As stated in prepared remarks before the HNSC on 7 March 1995, the trends are all going in the wrong direction. One metric might be "clean sheet" aircraft designs with the example of an aeronautical engineer from the 1950s era that would have had 84 military aircraft design opportunities compared to today's young engineer that might have one or two during his career. We as a nation are designing and building far fewer flying prototypes. Another metric could be aeronautical engineering enrollment at our universities and this is down from the past because students are aware of the extensive layoffs and resulting fewer employment opportunities throughout the industry. My suggestion is to slow down the decline so industry can continue to adjust to this new environment (and they are adjusting through consolidations, etc.). It's analogous to entering a fog bank; go slow to avoid a catastrophe.

March 31, 1995 Response to
Questions posed by
Congressman Duncan Hunter
In 15 March 1995 letter
To Gordon R. England

QUESTION: You cite a need for a "nominal" production rate of current fighters. We will procure 12 fighters for the entire Department of Defense this year. Secretary Perry seems quite comfortable with that number. (A) What is your evaluation of the effect the lack of adequate fighter/attack aircraft production rates will have on the fighter industrial base? (B) What number, or range of numbers, do you consider "nominal" to support the industrial base?

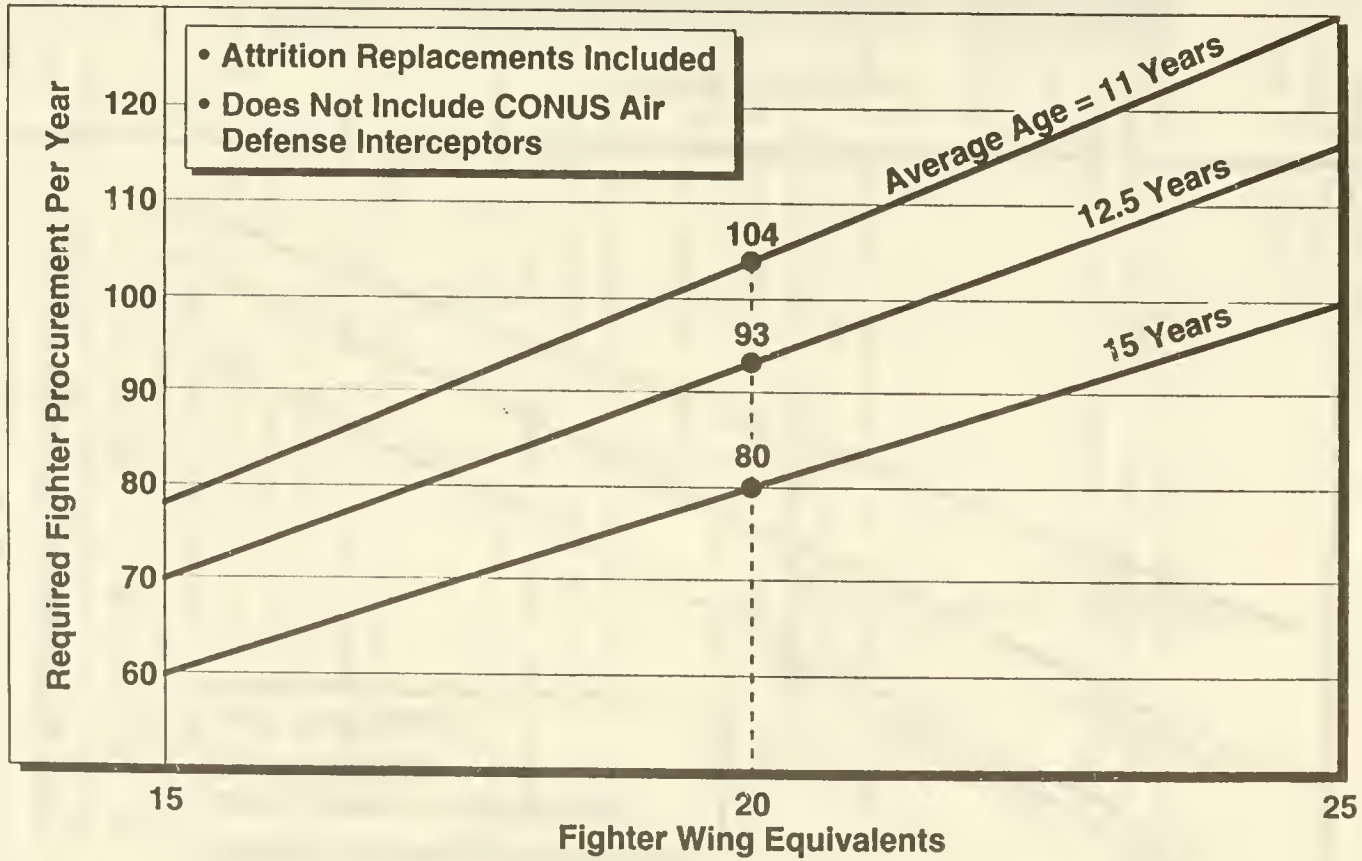
RESPONSE:

(A) The ultimate effect that the lack of adequate fighter/attack production rates will have on the fighter industrial base is that (1) it will either not be there in the future when needed (either in whole or more likely critical vendor elements), or (2) it will take additional time and treasure to reconstitute (robust treasure may not ensure timeliness). This cause and effect relationship creates a degree of risk which congress must decide is or is not acceptable in this post-cold war period of uncertainty.

(B) The "minimum sustaining" rate is between two and four aircraft per month for the F-16 production line. The specific rate is a function of the cost to restructure the production line for very low rate versus the cost of inefficiencies at the higher rate. The eventual sustaining rate can be met by a mix of US and international aircraft. The US fighter industrial base is currently surviving due to the backlog of international sales that is sustaining the F-16 and F-15 vendor bases and to a lesser extent, the F-18. This international backlog could be exhausted around the end of the decade. Without additional buys of 120 F-16Cs and 18 F-15Es (attrition replacement aircraft needed by the Air Force) and/or future international sales, the only current fighter that has a US Government planned and budgeted procurement future is the F/A-18 when production transitions to the F/A-18E/F derivative for the US Navy (the F-22 production is planned but not budgeted). Additionally, without domestic sales it is very difficult, and very problematic, to make international sales.

Additional comment is offered regarding the 12 fighters to be procured for the entire Department of Defense this year. The US tactical fighter/attack inventory, as with all other major military hardware accounts, is currently being sustained from investments made in previous years and the reduction in force structure as specified by the Bottom-Up Review (BUR). This is a transitory situation that will begin to see aircraft inventory shortfalls by the year 2000. Considering that there is a three year cycle time from aircraft procurement to delivery, now is not too soon to buy force sustainment aircraft to avoid falling below required inventory levels. Attached are two charts that show the annual buy of fighter/attack aircraft required to sustain the BUR force of 20 wings for the Air Force and 11 carrier air wings for the Navy plus the USMC fixed wing complement of fighters. Depending on the average aircraft age that is acceptable (11 years currently preferred by the Air Force), the annual fighter/attack procurement requirement ranges from 130 to 169 aircraft.

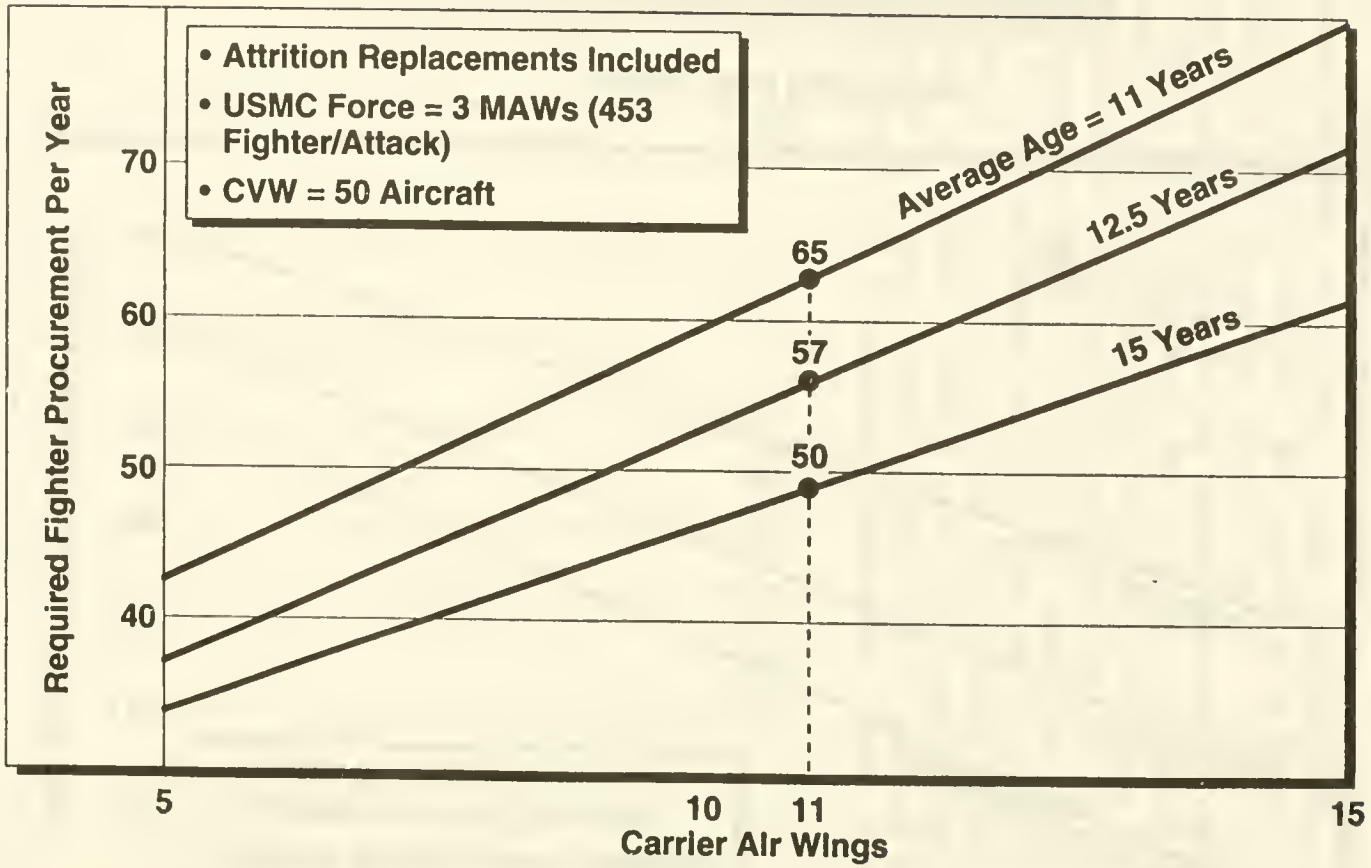
USAF Fighter Requirements



80 – 104 Aircraft Per Year Required To Sustain 20-Wing Fighter Force

MAC 0745(10) A

USN/USMC Fighter Requirements



50 – 65 Aircraft Per Year Required To Sustain Current USN/USMC Fighter Force

MAC 0745(11) A

March 31, 1995 Response to
Questions posed by
Congressman Duncan Hunter
In 15 March 1995 letter
To Gordon R. England

QUESTION: I am sure you are aware of the details of the JAST program, including ASTOVL. What are your views of this program? Does it fulfill the needs to support a baseline capability you cite in your statement?

RESPONSE:

In my judgment, the aerospace industry views the JAST program cautiously. The JAST objective is to produce an affordable "family of aircraft" from which the future Air Force, Navy, USMC, and US foreign military sales requirements are to be satisfied. Harmonizing such diverse requirements as carrier suitability, ASTOVL, affordable multi-role F-16 replacement, and an FMS aircraft that is releasable to our allies will be extremely difficult.

My own personal judgment is that all the services should sign up to specific common requirements. These requirements should then be validated by each service through extensive simulation. Substantial funding should be authorized after requirements are validated and agreed to by all the services.

JAST will not satisfy the baseline capability as cited in my statement. If JAST were to proceed into a development program, then one company team could maintain design skills on that family of airplanes. However, that leaves other companies without a future program design activity. Additionally, the task will be to design to a specific set of requirements and will not be pushing the envelope in new aeronautical frontiers. My vision is that a series of prototype programs will continue similar to the X planes in the 1950s to explore advanced aerospace technologies and to maintain a vibrant design base. When needed, these technologies could be committed to production.

March 31, 1995 Response to
Questions posed by
Congressman Duncan Hunter
In 15 March 1995 letter
To Gordon R. England

QUESTION: You state that you could do the Lightweight Fighter prototype program that was done in the early 70s for $250 million in today's dollars. The JAST program has had "affordability" as its centerpiece objective. It has had $250 million already appropriated, DOD is asking for another $300 million this year, and seemingly has no concept at all about the requirement, not to mention having a prototype aircraft in mind. Would you please comment?

RESPONSE: As stated in my response to the previous question, I recommend that a set of requirements be validated and agreed to by all the services before substantial funds are expended on the JAST program. Additionally, I would comment that the JAST is fundamentally different than a series of prototype programs. JAST is being directed by the military services to meet specific requirements when they are defined. That is different than how the F-16 evolved in the early 1970s. The F-16 had a limited set of requirements and broad discretion was left to each contractor team. We now have the perspective of time and it is now readily apparent that approach was very successful. In my view, we need a continuing series of prototype programs to maintain design skills, and those prototypes should be built by factory personnel on soft tooling. The "production" of prototypes is important to validate the producibility of the design. The prototype airplanes then need to be flight evaluated by the military so feedback can be available regarding military utility, acceptability, etc., etc. These prototype programs will not, however, maintain the production base. Production will need to be maintained through international sales and low rate domestic production. My comment in testimony was that for even relatively complex airplanes, we could still have two or more prototypes always in the design and development phase for about $1B a year and I still believe that to be valid.

March 31, 1995 Response to
Questions posed by Congressman Solomon Ortiz
In 15 March 1995 letter
To Gordon R. England

QUESTION: What impact does foreign military sales have on the ability to preserve the industrial base and keep the important skills and production lines available?

RESPONSE: The US fighter/attack production industrial base today is almost totally supported by foreign military sales. The F-16 production line has less than 40 aircraft remaining to be delivered to the US Air Force out of a 470 aircraft backlog. The F-15 production line is open only because of FMS, and the F/A-18C/D production line has a mix of US Navy and FMS deliveries that will bridge production until the F/A-18E/F starts delivery. This picture will remain relatively unchanged until later in this decade when the F-22 will enter production. The F/A-18E/F and the F-22 are currently not releasable to foreign customers and it is unclear when releasability might be considered. However, to make the F/A-18E/F affordable for the US Navy, it is my understanding that a projected FMS market of 1000 aircraft is included in the forward pricing and if that market does not materialize, the increased cost will have to be borne by the US taxpayer.

As far as critical engineering design skills are concerned, the F-22 and F/A-18E/F design tasks are nearing completion. That leaves only the work associated with the JAST program to sustain this highly perishable career field. This fact is what led to my remarks of 7 March 1995 before your committee that recommends the US Congress and the military services make moneys available for continuing development of prototype airplanes to extend our aerodynamic knowledge and to maintain our technical capabilities. There are international customers with sufficient treasure and unique defense needs that would invest off-shore moneys into US aerospace firms for development of derivative US fighter/attack aircraft. This brings us to the core of the issue. If the US defense budget does not adequately support the sustainment of critical aerospace design skills, then policy allowing off-shore dollars in this area should be considered. This raises the issue of proliferation, but US products can be managed through various techniques such as just-in-time logistics which controls the flow of spares necessary to operate the aircraft.

In summary, the continued US leadership in aerospace is now, and probably will continue to be in the future, dependent on foreign military sales to support our production industrial base. The same cannot be said for the critical design industrial base. Our nation needs to invest in recurring prototype programs or approve other countries to invest in derivative airplanes.

March 31, 1995 Response to
Questions posed by
Congressman Duncan Hunter
In 15 March 1995 letter
To Gordon R. England

QUESTION: What are your views on foreign dependency?

RESPONSE: As stated in my remarks of 7 March 1995, the F-16 industrial base is supported at the 85% level by foreign sales from 1994-2000. Foreign dependency to this degree is not necessarily bad and it is manageable.

During the development and production phases of a program, two types of foreign participation could be involved--active and passive. Active participation is characterized by programs such as the European F-16 Mid Life Update program where foreign industry and air forces actively influenced the end product. Passive participation can be characterized by programs such as the improved thrust F404 engine (for the F/A-18) which was funded by the Kuwaiti government but without direct influence in design or production.

Passive participation is certainly desirable and should be encouraged.

Active participation in both development and production is more complex but is manageable. Active participation in production programs generally results from competitive procurements requiring co-production of some components or piece-parts as a condition of sale. Active participation in development remains the most difficult challenge in that foreign development criteria may or may not coincide with US military needs. However, when needs are congruent, these programs can result in US capability upgrades where non-recurring costs are funded with off-shore dollars.

In summary, foreign dependency is not something we can or should necessarily desire to prevent and it can be controlled through proper management. It brings with it the continued investment of off-shore dollars that helps support our industrial base with the associated economic flowdown benefit to our nation. Perhaps more important, international sales provide leverage to the US government. These sales also provide US allies the opportunity to train and fight integrated with US forces.

March 31, 1995 Response to
Questions posed by
Congressman Duncan Hunter
In 15 March 1995 letter
To Gordon R. England

QUESTION: When the FS-X program was started with Japan it was touted as a program that would provide benefit to US industry through the transfer of technology to this country. What have been the results to date for this program?

RESPONSE: From the standpoint of United States involvement in general and benefits to the United States in particular, the FS-X Development Program has been very much a success story. There has been excellent and effective USG/US industry coordination and cooperation, particularly in dealing with Japan. There have been precedent-setting agreements, and good performance to those agreements - relative to providing benefits to the United States in terms of 1) US industry workshare, and 2) technology from Japan. The program has resulted in a large amount of work and useful experience for US industry and in benefits to the US industrial base and balance of payments. There is good potential for effective application of some of the Japanese technologies to future DoD programs.

Specifics Related to Technology Flow from Japan - All technology associated with the FS-X Program is available to the United States. In general, technology transfer from Japan, especially cocured wing-box technology, continues to proceed very satisfactorily. To date, approximately 30,000 FS-X data items (e.g., documents, drawings, magnetic tapes) have been transferred to Lockheed. With the completion of the first FS-X prototype aircraft (12 January 1995 rollout in Japan), a substantial increase is expected in manufacturing data transferred from Japan. In addition to data, per se, Lockheed personnel are participating in some Japanese design and manufacturing activities and observing other activities.

The United States has the right to use the Japanese FS-X technologies for any DoD purpose, and Lockheed has initiated assessments of these technologies. It is Lockheed's view that the FS-X technologies have good potential for enhancing future US aircraft. The dissemination and evaluation of FS-X technologies outside of Lockheed is now beginning.

March 31, 1995 Response to
Questions posed by
Congressman Duncan Hunter
In 15 March 1995 letter
To Gordon R. England

QUESTION: In your statement, you address the need for greater simplification in procurement rules and regulations to reduce costs to make aircraft more affordable. (A) What specifically would you change over and above what was achieved last year? (B) Similarly, what specific proposals has industry made regarding what you cite as "restrictive export policies?"

RESPONSE:
(A) Lockheed Fort Worth Company has proposed to the Secretary of Defense that Lockheed and selected subcontractors be nominated under statutory provisions as the "Fighter Aircraft Pilot Plant Program" in order to demonstrate the savings available by manufacturing defense products in a commercial environment. The Statutory provisions in the Federal Acquisition Streamlining Act of 1994 (FASA) allow nomination of pilot programs and waiver of some existing acquisition laws and regulations; the additional exemptions and waivers, such as audit rights and Truth in Negotiations requirements, contained in the draft legislative language submitted by the Department of Defense will build upon FASA and eliminate the inefficiencies imposed by the current system. Lockheed proposes that contracts be based upon the Uniform Commercial Code (UCC) instead of the Federal Acquisition Regulations (FAR) and that all laws unique to the defense contracting environment be waived for the Pilot Plant Program. This approach will enable Lockheed and subcontractors to operate in a commercial context and achieve and pass along to our customers significant savings in the manufacture of the F-16 aircraft. In addition, the costs of oversight can be significantly reduced.

Attached for your further information is the cover letter for our Commercialization offer to the Department of Defense and the Air Force; this letter provides a concise summary of our proposed approach and the specific changes over and above changes achieved last year by the Perry Memorandum and FASA 94.

(B) US policy regarding fighter aircraft sales to South America is an example of restrictive export policy that hurts the American fighter/attack aircraft industrial base. Export licenses for US sales to this region have been denied while Britain, Israel, France and others are actively pursuing this market with the assistance of their respective governments. US industry will lose sales and the US government will lose leverage by not controlling spares, ordnance, etc.

Another example is Russia and France who currently offer a full complement of weapons and systems such as beyond visual range missiles, internal electronic countermeasures systems, and secure communications equipment as well as software source code. The US only releases such items on a case by case basis and the DOS has indicated that their general position is that they will not support release of similar US systems (even though foreign competitors will offer them) without additional rationale - if at all.

For example, in the United Arab Emirates, a competition for a new aircraft is under way. The UAE has stated as a "must" requirement the need for a state of the art launch and leave beyond visual range air-to-air missile. The US missile that meets this requirement is the Advanced Medium Range Air to Air Missile (AMRAAM) which has taken 15 months to get through the system and, while close, has not yet been released for the UAE. Hopefully, the UAE will continue to be patient. If not, this policy and the associated delay could be a contributing factor in this competition being won by Russia or France where a missile similar to AMRAAM has been offered to meet the UAE requirement.

BALLISTIC MISSILE DEFENSE

HOUSE OF REPRESENTATIVES, COMMITTEE ON NATIONAL SECURITY, MILITARY PROCUREMENT SUBCOMMITTEE, AND THE MILITARY RESEARCH AND DEVELOPMENT SUBCOMMITTEE,

Washington, DC, Thursday, March 9, 1995.

The subcommittees met, pursuant to call, at 2 p.m. in room 2118, Rayburn House Office Building, Hon. Duncan Hunter (chairman of the Military Procurement Subcommittee) presiding.

STATEMENT OF HON. DUNCAN HUNTER, A REPRESENTATIVE FROM CALIFORNIA, CHAIRMAN, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. HUNTER. The subcommittees will come to order.

We meet today to receive testimony on Department of Defense [DOD's] fiscal year 1996 budget request for ballistic missile defense. Our distinguished witnesses are: Lt. Gen. Malcolm O'Neill, the Director of the Ballistic Missile Defense [BMD] Organization; Brig. Gen. Dick Black, the Army's program executive officer for missile defense; Rear Adm. Tim Hood, the Navy's program executive director for theater air defense, and Brig. Gen. John Hawley, the Air Force program executive officer for space designate.

Gentlemen, welcome. Only General O'Neill will offer testimony, but all will be available to answer questions from the members. Allow me to make some opening observations.

As I see it, the BMD picture is decidedly mixed. On the one hand, we are beginning to see the payoff of prior year investments. Improvements to existing missile defense and related systems are now being fielded. The reverse forever syndrome is finally drawing to a close, and it is my firm belief if this program is to survive, we must focus on getting real hardware deployed as soon as possible. I do not support what has been termed a welfare program for well-connected scientists. Deployment is and must be our objective.

Again, we are making some strides in that area, as General O'Neill will describe in a moment. On the other hand, the fiscal year 1996 budget request for missile defense is inadequate in my judgment. Now, admittedly, $2.9 million is a lot of money, but let us keep that figure in perspective.

First, this amount is half a billion below the amount DOD told us last year they planned to spend in fiscal year 1996. So they have cut half a billion. We want to know more about why and how this cut was made.

Second, this amount is the lowest budget request for missile defense since the Strategy Defense Initiative [SDI] program was established over a decade ago. More broadly, the administration's 5-

year budget for BMD is approximately 60 percent less than the amount recommended by the Bush administration.

Now, the fiscal year 1996 budget request for national missile defense is $371 million, which represents an 80-percent cut from the Bush levels. This is even less in real terms than Jimmy Carter spent on national missile defense research. Plus, there is no commitment to deploying an NMD system, only options to do so.

I have said it before, an option will not shoot down an incoming missile. This administration's budget includes no funds for actually procuring a defense against missile attack, and I am one Member who finds that unacceptable.

Even theater missile defense has suffered under this administration. The 5-year budget for Theater Missile Defense [TMD] is approximately 30 percent below the Bush levels. While some programs, such as THAAD and Patriot, appear on track and well-funded, other important TMD efforts are being starved for lack of funding and here I am primarily referring to the Navy Upper Tier Program, which took a pretty solid hit under this year's budget.

The Bottom-Up Review endorsed the Navy Upper Tier as a core. That is highest priority, TMD acquisition program. Since then, funding for the program has been slashed and relegated to research and development [R&D] only status. Likewise, I am deeply concerned about the administration's approach to negotiations with Russia and others on whether or how the anti-ballistic missile [ABM] Treaty should inhibit United States TMD systems.

Certainly, for those of us who met with a number of Russians representing the Armed Services Committee in the Duma over the last several months, what our administration has said to them has given them the impression that perhaps ABM should be extended to include theater missile defense.

I personally would strongly oppose any efforts to multilateralize the ABM Treaty to impose design limitations on U.S. TMD systems or to foreclose the option of deploying promising TMD concepts such as Navy Upper Tier. Thus, in my opinion, the administration's rhetoric about a robust, quote, "robust missile defense program" does not match the reality of an inadequate budget, the lack of commitment to defend the American people, and what I would characterize as an arms control strategy that would deny our troops protection they need and deserve.

Let me turn now to my colleague from Pennsylvania, Mr. Weldon, who is one of our experts on the Committee on Missile Defense and who has been a real leader in moving this issue to the fore.

Mr. Weldon.

STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, MILITARY RESEARCH AND DEVELOPMENT SUBCOMMITTEE

Mr. WELDON. Thank you, Mr. Chairman. I welcome all of our witnesses here and look forward to their testimony. Unanimous consent to insert a formal opening comment in the record.

[The opening statement of Mr. Weldon follows:]

PREPARED STATEMENT OF HON. CURT WELDON

Thank you, Mr. Chairman. I am pleased that our subcommittees are joining once again to address a priority issue in this Congress—defending our Nation against missile threats.

[We have both worked this issue for years along with many in this Committee—and most of those years you and I were working from the minority side. I have to say, I like the view from here, and it sure feels good to be working this issue from the majority side.]

President Clinton told the UN General Assembly in 1993 that "one of our most urgent priorities must be attacking the proliferation of weapons of mass destruction * * * and the ballistic missiles that can rain them down on populations hundreds of miles away." Secretary Perry says that this administration is supporting a "robust missile defense effort." But the administration's actions are not consistent with its words.

Consider, for example: The Clinton BMDO request is 50 percent that of the Bush administration levels. The fiscal year 1996 request is $500 million below last year's request, and the lowest amount requested since the program was established over a decade ago. The THAAD Program, while moving along, will receive less money this year than last, as will the National Missile Defense effort. Navy Upper Tier—the one program which might be effective against the North Korean's TD–2, was cut. We're still doing basic R&D on National Missile Defense, while proliferation could easily create new missile threats. North Korea is working on a system which if matured as expected in the next few years, could reach Guam and the State of Alaska—the Taeop Dong 2 [TD–2]. And they too will sell to any bidder. It will take several years to put a system in place to deal with that threat. The THAAD Program will receive less money this year than last, as will the National Missile Defense effort. Navy Upper Tier—the one program which might be effective against the North Korean's TD–2, was cut.

If history is any guide, I hope the administration isn't going to make any bold statements about the importance of missile defense anytime soon. If that happens, we may find ourselves back here next year without any program at all.

Despite the best efforts of some real troopers in this room, including some of our witnesses, ballistic missile defense efforts in my view appear to be running contrary to what we know about the threat and what we know we can do about them.

This Congress is going to ensure that the deployment of mature systems is pursued and that ballistic missile defense programs do not become a national science fair on our watch. We will pursue missile defense for the full range of threats, including cruise missiles. We will be seeking the input of many sources. We look forward to hearing from our witnesses on this budget and will be seeking their advice and that of others on how we could enhance the current effort.

Mr. WELDON. I did want to make several points building upon what you said. It was in 1993 before the U.N. General Assembly that President Clinton said and I quote, "One of our most urgent priorities must be attacking the proliferation of weapons of mass destruction and the ballistic missiles that can rain them down on populations hundreds of miles away," end quote.

Secretary Perry has said that this administration is supporting quote, "a robust missile defense effort," end quote. But the actions of this administration are not consistent with its words. And through this and other hearings we are going to have on missile defense, we are going to lay this record out to the American people.

Just recently, the administration has announced it is going to allow the sale of rocket motors to China, not just the motors, but the technology that will improve the capability of the cruise missiles that China is about to produce. We have to explore that entire proposed action.

The BMD request by the administration is 50 percent below that of the Bush administration levels. The fiscal year 1996 request for BMD is $500 million below last year's request. The THAAD Program will receive less money this year than last as will the national missile deference efforts and Navy Upper Tier. While we are

still doing some basic research on R&D on national missile defense, we are not really addressing this concern.

What bothers me is when you hear that the Russians have offered the SS–25 and SS–25 battery to Brazilians for use as a space-based launch vehicle, that is exactly the kind of threat that we are going to have to face, the possibilities of a mobilely launched SS–25 battery being sold to some Third World rogue nation that presents a real threat to our mainlands.

The North Koreans have missiles ranges up to 5,000 kilometers that could hit Guam or Alaska. These threats are real, not imagined, and could be here over the next several years.

In these series of hearings, we have to explore missile defense based on the facts, based on the real threats, not pie-in-the-sky rhetoric we heard on the House floor in terms of an emotional debate, and rhetoric using terms like star wars, but the facts that are out there that the American people have been misled on. Every poll I have seen shows the American people feel that we have, in fact, protected them and that is just not the case.

So I look forward to these hearings, especially to our good friends that are here, who have been out there in the trenches fighting these battles while perhaps we have not been as supportive as we could have and should have been. So I look forward to the testimony today and to the questions that will follow.

Mr. HUNTER. I want to thank the chairman of the R&D Subcommittee for his statement and let me just say, too, that we on the R&D and procurement subcommittees appreciate the chairman, Mr. Spence, and the ranking member, Mr. Dellums, chairman and ranking member, respectively, of the full committee, appearing and expressing enough interest in this vital subject to be with us and spend as much time as you have in this area. Thank you for being with us.

Let me turn now to the distinguished gentleman from Missouri, Mr. Skelton, for any remarks he might want to make, the ranking member of the Procurement Subcommittee.

STATEMENT OF HON. IKE SKELTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MISSOURI, RANKING MINORITY MEMBER, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. SKELTON. Mr. Chairman, thank you, very much. Let me take this opportunity to welcome Generals O'Neill, Hawley, and Black, and Admiral Hood to our joint committees and we look forward to your testimony.

It is important to have the different services represented today, because you are the operators of what is going to come to pass in the future. Also, I would like to ask questions at the proper time concerning the upcoming topic known as roles and missions, which I think is under the so-called White Commission, which will set forth its recommendations in a couple of months.

One of the elements of that is, of course, the debate which service or services will be responsible for air defense which, of course, includes missile defense. And I know the competition is hot and heavy between the various services behind closed doors as of this moment. I would like to get your thoughts on that, if we may.

I am a strong proponent of missile defense, and if we have learned anything from the gulf war, it is that there is a potential vulnerability of our troops wherever they may be in theater from missile attack. We did have one very, very sad incident as a result of this and other near misses and I am interested in learning more about how we can move the Theater Missile Program forward.

Also, I am interested in the national missile defense, which we had a great deal of discussion over on the floor, and, in my opinion, we have to walk before we run in that particular area, but we would like to have your thoughts on that especially on the various costs, the type of performance we could look forward to. All of this, of course, is going to be budget driven, sadly, and I know I sound like a broken record to my colleagues, but we have to make sure we have enough money for the troops because you want the first class young men and young women who are in uniforms, you cannot have second-raters operating these or any other technical systems that we have.

So as we look at the cost of these various things, your testimony today, hopefully, will be of a great deal of help to us. We thank you, again, for being with us.

Mr. HUNTER. I want to thank the gentleman from Missouri and let me just say we have a vote on. It is probably about 12 minutes left. What I would like to do is ask Mr. Spratt, who is the ranking member of the R&D Subcommittee to give his opening statement and what we will do then is try to get back in about 12 minutes, if at all possible, go and come as fast as possible, and open up with General O'Neill when we reconvene.

Mr. Spratt, is that suitable for you?

STATEMENT OF HON. JOHN M. SPRATT, JR., A REPRESENTATIVE IN CONGRESS FROM THE STATE OF SOUTH CAROLINA, RANKING MINORITY MEMBER, MILITARY RESEARCH AND DEVELOPMENT SUBCOMMITTEE

Mr. SPRATT. That is fine. I don't have a formal opening statement. I want to welcome our witnesses and say that I think our ballistic missile defense is in highly capable hands today. I have been a long-time believer in ballistic missile defense. I also believe we have limited resources, and part of the challenge before us with respect to the defense budget is how to husband our resources and spend the money that we have and allocate our resources prudently.

That, to me, means we should go first and foremost with the development of the core theater ballistic missile defense systems, but we should not altogether abandon the notion that we should have someday a ballistic missile defense.

Ironically, and to some extent paradoxically, ballistic missile defense for the whole Nation may make more sense in a world where the arsenals on both sides in the hands of both superpowers are declining. I always thought that ballistic missile defense for this entire continent was a far stretch when each arsenal had 10,000 to 12,000 strategic warheads. Each arsenal therefore was capable of saturating and overcoming any possible defense we could have erected despite the fact it was multilayered.

Now, as we live in a world approaching 3,500 warheads and maybe going as low as a couple thousand warheads, ballistic missile defense, as I said, paradoxically, begins to make more sense. And it may be a way of substituting for mutually assured destruction for a retaliatory strike as your best defense against your enemies' likelihood of striking you. So I think it makes sense when we have limited resources.

I would like to see us focus the system on those things in the near term that are attainable, that can be brought to fruition and be very disciplined about not going off in hot pursuit of other ideas that are well beyond the technological horizon. To that end, I look forward to the testimony of our witnesses today.

Mr. HUNTER. I thank the gentleman and thank him for the expertise that he brings to this hearing and we will break now for about 10 to 12 minutes and reconvene.

[Recess.]

Mr. HUNTER. General O'Neill, you are first up.

General O'NEILL. Thank you, sir.

Mr. HUNTER. The committee will be reconvened. General O'Neill, the floor is yours

STATEMENT OF LT. GEN. MALCOLM O'NEILL, DIRECTOR, BMD ORGANIZATION; BRIG. GEN. DICK BLACK, PROGRAM EXECUTIVE OFFICER FOR MISSILE DEFENSE, U.S. ARMY; REAR ADM. TIM HOOD, EXECUTIVE DIRECTOR FOR THEATER AIR DEFENSE, U.S. NAVY; AND BRIG. GEN. JOHN HAWLEY, PROGRAM EXECUTIVE OFFICER FOR SPACE DESIGNATE, U.S. AIR FORCE

General O'NEILL. Mr. Chairman, I have a formal statement that I would like to submit for the record.

Mr. HUNTER. Without objection.

General O'NEILL. Thank you, sir. I also have some opening remarks, if I may.

It is a real pleasure for me and the program executive officers from the Army, the Navy, and the Air Force, to appear before you today, and as Director of the Ballistic Missile Defense Organization, to testify on the Department's BMD Program for fiscal year 1996.

My prepared statement provides a detailed look at the programs we are executing to make ballistic missile defense a reality. I am pleased to report considerable progress in this area. Today, as we sit here, our warfighters have in their hands significantly improved theater missile defense capabilities.

Since Operation Desert Storm, we have fielded first generation theater missile defense enhancements to existing air defense capabilities and existing early warning systems. We have deployed two upgrades to the Patriot system—the quick response package, which was designed to be fielded within a year of Desert Storm, and the guidance enhanced missile, and have improved the U.S. Marine Corps' Hawk system, all of which will provide better tactical ballistic missile defenses and air defenses for our troops.

We have fielded early warning system improvements, such as the Air Force's Talon Shield, and the Army's joint tactical ground system (JTAGS), which allow U.S. forces deployed overseas to more

rapidly obtain improved satellite warning data of ballistic missile launches. These improvements represent our first delivery of what my Air Force colleagues call rubber on the ramp.

Today, and throughout the remainder of the decade, we are making ballistic missile defense a reality. In the next few years, 2 years in the case of Patriot, we will begin fielding the Patriot advanced capability No. 3. We will also field shortly thereafter the Navy's area defense system, and shortly after that the Army's theater high altitude area defense system.

These three core theater missile defense systems represent a tremendous increase in the TMD capabilities we will provide to the warfighter. And these are capabilities both in cruise missile defense as well as in theater ballistic missile defense.

They provide protection over wider areas than current systems and will be effective against the full spectrum of existing theater ballistic missile threats. We remain committed to ensuring that as new theater ballistic missile threats arise, highly effective defenses will be in place to protect our forces.

I think our accomplishments in the arena are directly attributed to the strong executive-congressional consensus for theater missile defense, which has been in state over the past few years. This consensus has given us a stable program, which is one of the things we need in the acquisition business, in the form of direction, resources, systems, and technologies, and this has helped us in no little way to make this progress.

I think we can repeat this accomplishment in national missile defense, as well. The Department maintains a well-focused Technology Readiness Program for national missile defense (NMD), which includes options for early deployment if required. This program is designed to mature the technologies critical to a defense of the United States and, once we conclude that the threat warrants the deployment, deploy them in a relatively short period of time and at an affordable cost. We are committed to ensuring that defensive systems are available to protect the Nation against potential missile threats.

I understand that the committee plans to hold a hearing in the weeks ahead to specifically address the issue of what we have accomplished with our investment in both SDI and ballistic missile defense. I would assert that those who suggest that our $30 billion investment has been spent on BMD without a product are simply not aware of the facts.

I look forward to bringing into the committee our technology and our system developments. At that hearing I am confident we will show you the fruit of our labor—real hardware and real capabilities that are either currently deployed or will soon be produced and deployed.

I think we should all be proud that together we have brought to bear the technology that allows defense against ballistic missiles regardless of their range.

Mr. Chairman, I look forward to working with this committee as well as the entire Congress to make highly effective and affordable ballistic missile defenses a reality.

Again, Mr. Chairman, it is my privilege to be here today and I look forward to answering your questions.

Statement of

Lieutenant General Malcolm R. O'Neill, USA

Director

Ballistic Missile Defense Organization

before the

Committee on National Security

House of Representatives

March 9, 1995

Embargoed Until
Released by
Committee on National Security

Mr. Chairman and Members of the Committee, it is my privilege to appear before you today to present the Department's Ballistic Missile Defense (BMD) program for FY 1996.

The BMD program continues on the course set by the Administration in its 1993 Bottom-Up Review. First, to meet the existing missile threat to forward deployed U.S. and allied forces, we are developing and deploying increasingly capable theater missile defenses (TMD); As second priority, as a hedge against the emergence of long-range ballistic missile threats, we are developing options to deploy a national missile defense (NMD) for the United States; and, as third priority, we continue to support limited research on more advanced ballistic missile defense technologies to keep pace with the threat and improve the performance of theater and national missile defense systems.

I am pleased to report considerable progress. Today, we are fielding initial improvements to the PATRIOT system. This includes the PATRIOT Quick Response Program, which enhanced the PATRIOT radar's capability to support tactical ballistic missile engagements; and the Guidance Enhancement Missile for PATRIOT, which improved the lethality of the interceptor. We are also fielding an improved U.S. Marine Corps HAWK Air Defense System with initial tactical ballistic missile defense capabilities, and the means to provide early warning of ballistic missile launches directly to U.S. forces overseas. Within two years we will field an operational prototype of the Army Theater High Altitude Area Defense (THAAD) system. We are scheduled to begin fielding the PATRIOT Advanced Capability-3 system within three years and will deploy an operational prototype of the Navy lower-tier TMD system around the same timeframe. I think you will agree when I say we are making great strides in putting TMD "rubber on the ramp" for the warfighter. The Executive-Congressional consensus for theater missile defense over the past few years has afforded us a stable program -- in both systems and technology, as well as resources -- from which we have been able to field first generation TMD enhancements to existing air defense capabilities.

Similarly, our ability to maintain a fairly stable technology base for national missile defenses will allow a contingency national missile defense to be deployed if necessary. Our

technology readiness program will allow us to deploy an NMD capability within a few years of a decision to do so. This system will provide a capability to counter possible future long-range missile threats to the United States.

Before I delve into the program specifics, I would like to spend a few moments discussing the role of ballistic missile defense in our national security strategy and briefly touch upon the existing and emerging ballistic missile threat.

BMD and U.S. National Security Strategy

Ballistic missile defense plays a central role in U.S. national security strategy by supporting our defense and counterproliferation objectives. The requirement for BMD flows from a strategy that requires the U.S. to maintain a credible overseas presence and the capability to respond to major regional conflicts despite the increasing danger posed by the proliferation of ballistic missiles. In a world of regional threats to the U.S., BMD affords the U.S. greater freedom of action to protect its interests and uphold its security commitments without fear of coercion. BMD can bolster the solidarity of coalitions and alliances (as it did in Desert Storm), and provides a response to crises without having to resort to offensive measures (as it did recently in South Korea). Finally, BMD strengthens the credibility of our deterrent forces and provides an essential hedge against the failure of deterrence.

In September 1993, President Clinton told the United Nations General Assembly that "one of our most urgent priorities must be attacking the proliferation of weapons of mass destruction . . . and the ballistic missiles that can rain them down on populations hundreds of miles away." In response to the proliferation challenge to international security, the U.S. continues its strong support for existing non-proliferation activities, which include the full spectrum of political, economic, and military tools to prevent and reverse proliferation. To complement these activities, the Department announced in December 1993 the development of a new Counterproliferation Initiative, organized along two complementary tracks: prevention and protection. BMD contributes to both tracks. By devaluing ballistic missiles, BMD discourages or helps to prevent the spread of ballistic missiles; by protecting against ballistic

missile use, BMD permits the conduct of military operations and strengthens the solidarity of coalitions in the face of weapons of mass destruction and ballistic missile threats.

The Threat

The importance of BMD is underscored by the growing proliferation of weapons of mass destruction and ballistic missiles. Currently, more than 25 countries possess or may be developing nuclear, chemical or biological weapons. This situation is exacerbated by the difficulties of controlling the spread of sensitive technologies supporting ballistic missile development. Today, more than 15 nations have ballistic missiles; by the year 2000, perhaps 20 nations will have them. Many of the countries that are developing or acquiring ballistic missiles are also seeking to acquire, or already have, weapons of mass destruction. Ballistic missile technology is already widely available and much of its international trade remains essentially outside the bounds of Western controls. North Korea and China, are particular concerns in this area. Consider, also, that the danger posed by new possessor states is complicated because they may or may not respond to traditional deterrence approaches as applied to the Soviet Union during the Cold War. These new proliferators can be expected to have different doctrines, histories, command and control systems, and purposes for their unconventional military forces. Moreover, they may acquire such weapons for the express purpose of blackmail or terrorism and thus have a fundamentally different calculus not amenable to deterrence.

The Intelligence Community is closely monitoring the development and deployment of ballistic missiles in the Third World. The current threat includes tens of countries armed with ballistic missiles, hundreds of missile launchers, and thousands of missiles with ranges from 80 to greater than 3,000 kilometers. While these weapon systems pose a threat today that is largely regional in character, the trend is clearly in the direction of systems of increasing range, lethality, accuracy and sophistication.

An example of the growing sophistication of Third World ballistic missile developments are the long-range missiles under development in North Korea. One missile,

the No Dong, was tested in 1994 and may be capable of carrying nuclear, chemical or biological weapons. Reportedly, the North Koreans are developing two additional missiles with ranges greater than the 1,000 kilometer No Dong. Deputy Secretary of Defense John Deutch last year noted that, "If the North Koreans field the Taepo Dong 2 missile, Guam, Alaska and parts of Hawaii would potentially be at risk." Additionally, James Woolsey, the former Director of Central Intelligence, testified that these new missiles "could put at risk all of Northeast Asia, Southeast Asia and the Pacific area, and, if exported to the Middle East, could threaten Europe as well."

Only Republics of the Former Soviet Union and China today possess missiles capable of reaching the United States. While both countries continue to modernize their ballistic missile forces, the Intelligence Community has assessed that a deliberate attack by Russia or China on the United States would appear as highly unlikely. Accidental or unauthorized launches of Chinese or Russian nuclear missiles also have been assessed to be unlikely.

While no other potentially hostile nation currently possesses the capability to threaten the U.S. with ballistic missiles, the possibility of a limited, long-range ballistic missile threat from the Third World sometime in the not-too-distant future cannot be excluded. Director of Central Intelligence Woolsey's 1993 Congressional testimony on the subject remains valid today. He stated:

> . . .After the turn of the century, some countries that are hostile to the United States might be able to acquire ballistic missiles that could threaten the United States. We can't give you a precise date -- whether its eight years or ten years or fifteen years from now -- by which that might occur.
>
> . . .A short-cut approach that's prohibited by the Missile Technology Control Regime and by the Non-Proliferation Treaty would be for such Third World countries to buy ICBMs or major components covertly together with suitable nuclear warheads or fissile materials. Anything such as that would, of course, speed up ICBM acquisition by such nations.

Such statements indicate that indigenous development of long-range ballistic missiles by potential aggressor states could occur early in the next century while transfer of existing Russian or Chinese systems, components, technology or expertise might occur in contravention of the Missile Technology Control Regime (MTCR) and Non Proliferation Treaty (NPT), at any time.

In addition to the proliferation of ballistic missiles, the Department is increasingly concerned about the growing number of countries possessing cruise missiles. Currently, 77 nations have cruise missiles, with about 130 different types being produced by 17 countries. The principal missions for these systems are land-attack and anti-ship attack, with the anti-shipping role the most common. Thirteen countries are developing land attack cruise missiles. Iran is expected to deploy a system that is converted from a UAV by the year 2000. China is working on a system with moderate signature reduction that could be deployed about the same timeframe. Cruise missiles are marketed actively throughout the world, which indicates that very potent systems may reach the hands of potentially hostile countries.

As we develop our upper and lower-tier theater missile defense systems, we are purposely "harmonizing" our ability to address both the cruise and tactical ballistic missile threats. For example, current upgrades to the PATRIOT system maintains its potent air defense capabilities. Similarly, the PAC-3 and Navy Area Defense systems, projected to begin deployments by the end of the decade, will continue to have a robust capability against air-breathing threats such as cruise missiles. In addition, our advanced capability lower-tier TMD systems will have a cruise missile defense capability in addition to their primary mission of ballistic missile defense.

The Warfighters' Requirements for BMD

As the developer of ballistic missile defense systems and technologies, I have strongly advocated inside the Department the urgent need for a U.S. missile defense capability. I am encouraged that several of the warfighting CINCs have similarly advocated the priority of missile defenses. For example, General Peay, Commander in Chief of U.S. Central

Command, ranks theater missile defense (TMD) as one of his three most critical requirements. In testimony earlier this year before the four defense committees, he testified:

> The continued proliferation of ballistic missiles and weapons of mass destruction, combined with the relative ease with which potential adversaries can enhance armaments through purchases of "off the shelf" technology, calls for enhanced theater missile defenses and space-based capabilities that will protect U.S. forces, support strategy, and facilitate warfighting. The priority over the next ten years should be to establish a multi-layered missile defense founded on lower-tier Patriot Advanced Capability III; with a variant for naval defense; upper-tier Theater High Altitude Area Defense (THAAD); and highly mobile point defense Corps SAM (Surface to Air Missile) to protect ground forces maneuvering rapidly over extended distances. We must also devote resources to detecting unmanned aerial vehicles as well as cruise and short range missiles; to enriching the missile tracking capability of our satellite program to provide rapid, highly accurate flight data on enemy missile launches; to expediting our acquisition of theater-based capabilities to directly down-link satellite data for intelligence and rapidly transmitting it to subordinate units; to broadening our satellite communications architecture to ensure that it meets future demands; and to fielding interoperable systems that support joint and combined operations. Your support for these initiatives is essential to their achievement.

Similarly, General Joulwan, Commander in Chief of United States European Command, considers the development and deployment of improved theater missile defenses a high priority. In his recent testimony, he observed:

> In USEUCOM, we face a challenging theater missile threat, particularly in the southern region. At present our theater missile defense systems are limited to protection capability and force deployability. Just over the horizon are several new systems in final stages of development that address the theater missile defense threat. We need to pursue the development of these systems today, to make them operational in the near future.

General Ashy, Commander in Chief of North American Aerospace Defense Command (NORAD) and Commander in Chief of United States Space Command (USSPACECOM), recently testified on the need for both theater and national missile defense systems.

> First, we must field a ballistic missile defense system to deal with the theater threat. This threat is real today and will remain so for the foreseeable future. We should continue to pursue technology which will support the deployment of a national missile defense when the threat dictates. U.S. Space Command, in conjunction with the other CINCs, has documented operational requirements for such a system. . . .The need for deployment of a national missile defense is not a question of if, but when. The current program calls for deployment of a theater system to deal with the current threat, and gives us the option of responding appropriately to threats which might emerge against North America.

Last year Admiral Boorda, Chief of Naval Operations, and General Mundy, Commandant of the Marine Corps, similarly identified TMD as one of their high priorities. "The first priority of the Navy and Marine Corps in Theater Missile Defense is the rapid fielding of the Navy Area TBMD capability as a "core" system. . . There is a compelling national requirement for this capability and we need to move out to obtain it."

My staff and I work closely and cooperatively with the Services as we seek to develop and acquire BMD systems. In this regard, BMDO interacts with the CINCs to ensure we are responding to the needs of the warfighter and we work with the Service Program Executive Officers (PEOs) to execute key BMD acquisition programs and put real capability into the hands of military forces.

Based on my understanding of the ballistic missile threat, and the requirements of the CINCs, I believe we have the correct prioritization of BMD programs. Theater Missile Defense <u>must</u> be our top priority. The theater-class ballistic missile threat exists today. Our forces have already suffered losses from ballistic missile attack -- indeed in Desert Storm a single SCUD missile accounted for a quarter of the total casualties inflicted upon our forces by Iraq. However, I would like to note that while this prioritization is correct, we need to work together to make sure that the funds allocated to each portion of the program are balanced. In this regard, NMD is the second priority relative to TMD and technology is the third priority.

Following TMD and within budget limitations, National Missile Defense and Technology must be high priorities for the Department and Congress. While the theater ballistic missile threat exists today, I am increasingly concerned about the potential ballistic missile threat to the United States. In fact, earlier this year I requested that the Intelligence Community update its assessment of the ballistic missile threat to the United States. I want to make sure that the systems in which we are investing our resources will be able to defend against the potential threat. I encourage the Intelligence Community to assess what types of longer-range ballistic missiles potential belligerents are, or will be capable of, developing indigenously, along what timelines, and with what types of warheads. In addition, I am particularly interested in the types of missiles potentially hostile countries may be able to obtain through other means, such as theft or purchase of entire missile systems, or through the proliferation of missile components, technologies, and expertise. While I recognize these may be difficult issues to assess, I consider it absolutely essential that the Intelligence Community maintain a current intelligence estimate on the emerging ballistic missile threat to the United States. We must make sure that an effective NMD system is available if that emerging threat appears in the near future and we determine that its use may not be deterred. Moreover, I think we should also consider the potential for, and implications of, a reversal in the positive changes we have seen in the Former Soviet Union.

Lastly, a vital component of the BMD program, one which has borne the brunt of budget cuts in recent years, is the BMD technology program. As the DoD focal point for ballistic missile defense, BMDO is the only place in the Department where advanced BMD-unique technology programs are funded. A viable technology program is needed to support both theater and national missile defense efforts. It is a critical source of advanced component technology for current defensive systems, as well as for the development of future defensive system options. This portion of the BMD program is our technological "seed corn"; we must reinvigorate this critical part of the BMD program. We must remember that the threat does not stand still and neither should our technology developments to counter those threats. Indeed, in order to be fully effective against anything other than a "thin" ballistic missile attack against the U.S. in the future, we may need to utilize advanced technologies.

The Fiscal Year 1996 Program and Budget

For FY 1996 the Department requests $2.9 billion for the BMD program. Within this level of funding, we are requesting $2.1 billion for TMD, $371 million for NMD, $172 million for Supporting Technologies, and $185 million for Management Support. The funds for TMD would support RDT&E, Procurement and Military Construction activities. Table A provides detailed budget information.

Theater Missile Defense is Our First Priority

The TMD program consists of three sequential efforts. First, we are making near term improvements to existing air and missile defense systems to enhance their abilities to defend against shorter-range tactical ballistic missiles. In this sense, we are literally making ballistic missile defense a reality as we speak. As part of this phase of TMD improvements, we have deployed TALON SHIELD/JTAGS, U.S. Marine Corps HAWK upgrades, and PAC-2 Guidance Enhanced Missile (GEM). We have also "deployed" the Extended Air Defense Test Bed (EADTB), which serves as a critical support tool. In addition, we have worked diligently to improve the CINCs' application of TMD improvements through our CINC TMD assessment program. Each of these have significantly improved our Nation's TMD capabilities over those that existed during Desert Storm and are a direct result from past investments in BMD. These near-term improvements represent our first delivery of "rubber on the ramp" for enhanced TMD systems. I would like to provide a quick overview of just a few of these near-term improvements.

Talon Shield/Joint Tactical Ground System: These systems use Defense Support Program (DSP) satellite data, newly developed algorithms and upgraded processing hardware to significantly improve the provision of early warning information of ballistic missile launches to U.S. forces overseas. In October 1994, the U.S. Air Force activated the first Attack and Launch Early Reporting to Theater (ALERT) squadron with an operational version of the BMDO-developed TALON SHIELD system at Falcon Air Force Base, Colorado. The ALERT squadron will achieve its initial operational capability this week. JTAGS, also

TABLE A

FY 1996 PB SUBMISSION
BALLISTIC MISSILE DEFENSE ORGANIZATION
($ In Thousands)

		FY1994 Actual	FY1995 Estimate	FY1996 Estimate
Funding by Congressionally Mandated PE Structure				
BPI		37,022	40,000	49,061
CORPS SAM		16,270	14,971	30,442
HAWK		29,629	30,604	28,294
MANAGEMENT		205,948	163,206	185,542
NAVY LOWER TIER		150,446	154,070	254,370
NAVY UPPER TIER		81,000	68,450	30,442
NMD		552,950	387,518	371,453
OTHER TMD		272,388	386,368	463,047
PAC3		239,796	529,555	647,384
PAC3 RISK EMD		97,000	74,000	19,485
SUPPORT TECH		323,022	218,407	172,695
THAAD SYSTEM		710,093	651,901	589,927
TMD-BMC3		12,617	20,543	70,774
BMDO TOTAL		2,728,181	2,739,593	2,912,916
Funding by Appropriation				
RDT&E TOTAL		2,605,089	2,467,593	2,442,199
EXPLORATORY DEVELOPMENT	(BA02)	*70,160*	*84,005*	*93,308*
ADVANCED DEVELOPMENT	(BA03)	*252,862*	*134,402*	*79,387*
DEMONSTRATION/VALIDATION	(BA04)	*1,937,022*	*1,735,163*	*1,564,782*
ENG. & MANUFACTURING DEV.	(BA05)	*139,097*	*350,817*	*519,180*
MANAGEMENT SUPPORT	(BA06)	*205,948*	*163,206*	*185,542*
PROC		120,115	271,470	453,708
MILCON		2,977	530	17,009
BMDO TOTAL		2,728,181	2,739,593	2,912,916
Funding by Major BMDO Program				
TMD		1,646,261	1,970,462	2,183,226
NMD		552,950	387,518	371,453
SUPPORT TECH		323,022	218,407	172,695
MANAGEMENT		205,948	163,206	185,542
BMDO TOTAL		2,728,181	2,739,593	2,912,916

developed by BMDO, is a complementary tactical mobile DSP ground station for use in the theater. The U.S. Army has deployed several prototype units overseas to support the warfighter.

Hawk Air Defense System: The U.S. Marine Corps and BMDO have jointly funded improvements to the Marine Corps' HAWK system. The HAWK has been modified and tested to intercept short-range ballistic missiles. Last September, two LANCE target missiles were successfully intercepted by the modified HAWK system in an operational test by Fleet Marine Forces at White Sands Missile Range, New Mexico. Over one third of the active Marine Corps HAWK equipment has been modified to provide a basic, short range tactical ballistic missile defense (TBMD) for expeditionary Marine forces. This year we are requesting $28 million for the HAWK upgrades. The entire fleet inventory will be modified with this capability by the end of Fiscal Year 1996.

Patriot Guidance Enhanced Missile: Last month, the U.S. Army took delivery of the first PATRIOT Advanced Capability-2 Guidance Enhanced Missile (GEM). The GEM incorporates improvements to the front end of the PAC-2 missile receiver to enhance its effectiveness and lethality against SCUD-class ballistic missiles. With the GEM improvements, existing PAC-2 missiles will increase their defended areas and improve their lethality. We will field about 350 PAC-2 GEM missiles which will provide the principal improvement to our existing tactical missile defense capability until PAC-3 begins deployment in FY 1998.

Extended Air Defense Test Bed (EADTB): The EADTB provides a high fidelity, flexible, user-friendly, computer-based simulation tool for traditional air defense experiments with the added complexity of theater missile defense threats. It is oriented to large scale scenarios for system analysis and COEA support. The system will be capable of analyzing full theater-level scenarios and will permit evaluation of extended air defense systems. Initial node installations are complete at SHAPE Technical Center, the Hague, Brussels; Advanced Research Center, Huntsville, AL; and Fort Bliss, Texas. BMDO will run a series of BMC3I

experiments on the EADTB to evaluate the simulation system and provide data for BMC3I architecture studies.

CINC TMD Assessment Program: This program has improved current TMD capabilities in the field by funding the inclusion of realistic TMD activities into existing CINC exercises, providing expertise to the CINC in exercise planning and communications connectivity, and bringing new concepts and capabilities to the field. The CINC TMD Assessment program has fostered increasing interest in TMD among the CINCs and has substantially increased current and near-term theater capabilities. For example, these assessments have been exploited by U.S. Forces Korea to develop the initial concept of operations for missile defense in its area of operations. CINCs participating in the CINC TMD Assessment program include Central Command, European Command, Pacific Command, Space Command and Atlantic Command.

Core Theater Missile Defense Systems

Following the near-term enhancements, we have established a set of "core" TMD programs. The three core programs represent the bulk of our RDT&E and Procurement budget requests for FY 1996. The core includes the PATRIOT Advanced Capability-3 (PAC-3), Navy Standard Missile II Block IV A (Navy Area Defense), and Theater High Altitude Area Defense (THAAD) systems. The variety of scenarios and threat characteristics (maximum/ minimum ranges, reentry vehicles, radar cross sections, reentry vehicle temperatures, etc.) and the characteristics of the defended areas (military forces, population centers, ports of debarkation, etc.) require complementary systems for complete and cost-effective defenses. Therefore, we are developing a core set of systems which will begin deployments by the end of this decade and will greatly improve our defense against the existing theater ballistic missile threat.

PAC-3: Last year the Department selected the ERINT missile to satisfy the PAC-3 requirement to provide significantly improved capability against theater missile threats. PAC-3 represents a significant upgrade to an existing air defense system to specifically handle

stressing theater ballistic missile threats. The selected PAC-3 missile uses hit-to-kill technology to destroy attacking TBMs and was selected principally for its lethality against these missiles, especially those with weapons of mass destruction. Improvements to the PATRIOT system that comprise the PAC-3 enhancements will result in: increased firepower and lethality; increased battlespace and range; enhanced battlefield awareness; and improved discrimination performance. These enhancements will be achieved by not only the improved missile, but also improvements to the radar, communication and discrimination systems. Use of remote launch operations will also increase the battlespace and range of the PAC-3 system.

The PAC-3 missile (ERINT) entered the Engineering and Manufacturing Development (EMD) phase of the acquisition process in October 1994 and is the only missile in development for the PAC-3 program. Risk reduction/mitigation activities on the PAC-3 program are ongoing and will focus on the PAC-3 missile and the system's capability to address the full spectrum of threats, including advanced cruise missiles. In FY 1996 we are requesting $666.8 million for the total PAC-3 program. This includes $247.9 million for EMD activities, $19.4 million for risk reduction/mitigation efforts, and $399.4 million for procurement. We plan to begin fielding the PAC-3 system in FY 1998.

Navy Area Defense: Sea-basing of TBMD allows our nation to take advantage of the strength and presence of our naval forces. Navy vessels that are routinely deployed world-wide are currently in potential threat areas or can rapidly be redirected or repositioned. The Navy Area Defense program, previously referred to as Navy Lower-tier, as with PATRIOT represents another cost and operationally effective opportunity for us to upgrade an existing air defense system and give it substantial TMD capabilities as quickly as possible. In many instances, sea-basing theater missile defenses affords an opportunity to locate sensors and launchers closer to an aggressor's launch point. Thus, a naval TMD capability can be in place within a region of conflict to provide TMD protection for land-based assets before hostilities erupt or before land-based defenses could be transported to the theater. For instance, our forces may have to fight their way into the theater of operations, in which case naval

combatants could provide critical TMD coverage early in the conflict. Toward this end, BMDO and the Navy have been working together to develop an enhancement to the AEGIS/Standard Missile air defense system that would provide a tactical ballistic missile defense capability -- similar to that provided by the PAC-3 -- from the sea. The Nation is already investing over $40 billion in more than 50 AEGIS cruisers and destroyers that represent over 5000 operational vertical launch system (VLS) cells. The AEGIS ships that will be equipped for a TBMD capability will require no additional manning and already have the complete infrastructure for training, logistics, and engineering in place and operating. With a relatively modest further investment, we can enable a substantial near-term payoff in TBMD capability.

The Navy Area TBMD program focuses on developing modifications to the existing AEGIS Combat System, which includes changes to the STANDARD Missile, to extend its robust anti-air warfare capabilities to tactical ballistic missile defense. These modifications will enable tactical ballistic missile detection, tracking and engagement with a modified STANDARD Missile 2, Block IV (SM-2, Blk IV). This area defense program will provide AEGIS ships the ability to conduct lower-tier, or endo-atmospheric, intercepts of tactical ballistic missiles. In FY 1996 we are requesting $237.4 million for the Navy Area TBMD program. We plan to have available a UOES system in FY 1998 and the First Unit Equipped (FUE) in FY 2000. I consider the Navy Area Defense program a critical core TMD effort, and an important building block toward a Navy Theater-wide Defense (Upper Tier) program.

THAAD: The THAAD System is the only core TMD system which will be capable of engaging the full spectrum of ballistic missile threats. The THAAD system is comprised of an interceptor and the TMD Ground-based Radar (GBR) surveillance and tracking sensor. The THAAD system will provide a unique capability for wide area defense against TBMs at higher altitudes and longer ranges with a lethal hit-to-kill interceptor. This is a mission the PAC-3 and Navy Area Defense systems cannot perform.

THAAD is a critical TMD system because: first, it will destroy weapons of mass destruction higher up and further out than either PAC-3 or the Navy Area Defense systems; secondly, it cost-effectively protects many targets (civilian and military) over a wide area; and lastly, it provides the first tier of a defense in depth in the theaters. This will provide multiple shot opportunities against attacking ballistic missiles. By using THAAD as an upper tier, and the PAC-3 or Navy's SM-2 Block IV A interceptor as a lower-tier defense, the combined number of intercept opportunities is greatly increased. Thus, THAAD, PATRIOT and a Navy Area capability together provide us our first defense in depth. Moreover, high altitude interception serves to minimize both debris and ground-effects from weapons of mass destruction carried by theater-class ballistic missiles. Lastly, the THAAD system will be transportable on C-130 and C-141 aircraft, which will give it the capability for rapid deployment to all types of theaters of operation anywhere in the world.

The THAAD program is currently in demonstration/validation and beginning a series of flight tests. These tests begin this month, with the first flight to be conducted at the White Sands Missile Range, New Mexico. During the first set of flight tests, we will be testing the missile's ability to perform as predicted. In later tests we will attempt to intercept simulated theater-class ballistic missiles. Earlier this year the demonstration/validation flight test program was determined to be compliant with all international treaty obligations, including the ABM Treaty.

The TMD-GBR element of the THAAD system meets an immediate requirement for a more capable wide-area-defense radar in the theater. It provides surveillance and fire control support as an integral part of the THAAD system, and cueing support to lower-tier systems such as PATRIOT. The TMD-GBR utilizes state-of-the-art radar technology to accomplish its required functions of threat attack early warning, threat cueing, and launch and impact point estimation. In particular, TMD-GBR will be able to provide a capability to perform threat classification against tactical ballistic missiles, and kill assessment after intercept. The TMD-GBR will undergo a series of dedicated and integrated characterization tests in preparation for a THAAD System Milestone II decision. TMD-GBR development activities also serve as the

basis for the NMD-GBR Radar Technology Demonstrator program and in the longer term for an NMD Ground-based Radar.

Our plan is to develop a prototypical THAAD battery, what we call a user-operational evaluation system (UOES). This will enable the user to gain early experience on THAAD hardware and allow the developer to exploit user insights to improve the system while EMD is ongoing. This early contingency capability will be available to the warfighters at the end of the demonstration/validation phase for early operational assessment and possible deployment if an emergency or contingency warrants. Provision of the UOES is a major thrust and priority of the core TMD program. In FY 1996 we are requesting $413.7 million for THAAD and $162.5 million for its Ground-based Radar (GBR). Deployment of the objective THAAD system is planned for FY 2002.

Battle Management/Command, Control, Communications & Intelligence: BMC3I is one of the most important functions of the BMDO and is essential to fully exploit the full capabilities of the core TMD weapons systems. Successful BMC3I increases the time available to engage hostile missiles, increases the effective allocation of interceptors, and reduces the potential for "leakers" -- attacking missiles that penetrate our defense. It is truly the element which most solidifies the jointness of theater ballistic missile defense. Within the context of putting BMC3 "rubber on the ramp," we have successfully demonstrated the dissemination of launch warning into theaters, established message standards critical for the development of the Joint Data Net, and demonstrated prototype command and control centers for TMD. In FY 1996 we will see significantly increased activity in BMC3I as we extend the early warning demonstrations into fully operational systems, implement message standards in developing Command and Control (C2) host platforms, and support integration of JTIDS terminals into TMD C2 centers and C2 systems, such as the U.S. Air Force Contingency Tactical Air Planning System (CTAPS) and the Navy Joint Maritime Command Information System (JMCIS). As always, we will seek to minimize costs by taking advantage of planned theater air defense (TAD) BMC3I improvements and encouraging joint solutions for joint

requirements wherever possible. We are requesting $56.5 million in FY 1996 to support this increase in BMC3I activity.

Advanced Theater Missile Defense Capabilities

Lastly, we are developing advanced TMD capabilities. This includes Navy Theater Wide Defense (Navy Upper Tier); Medium Extended Air Defense System (MEADS) -- which you will recall as Corps SAM; and Boost-phase Intercept (BPI). These systems are currently in the concept exploration phase and a decision to proceed with further development will be based on a rigorous acquisition decision process. An advanced concept will be considered for a new acquisition start based on national priorities, current and projected threat developments, technical maturity, system effectiveness, lethality, operational need, international cooperation, and affordability. This process will include advanced technology demonstrations to provide early capability and reduce acquisition risk.

Navy Theater Wide Defense: The Navy Theater-wide TBMD program will provide an upper-tier Navy tactical ballistic missile defense capability. The Navy Theater-wide system, which could be among the first deployed TBMD systems in a regional crisis, could provide extensive areas of protection. This program is the second evolutionary stage of the joint BMDO-Navy TBMD program and will build on the baseline Navy Area TBMD (Lower Tier) program. It will use an interceptor with exo-atmospheric capability, such as the BMDO technology program-developed lightweight exo-atmospheric projectile (LEAP), or a marinized variant of the THAAD missile.

The BMDO-Navy LEAP Technology Demonstration Program, which was begun in 1992, has completed the necessary missile systems engineering to integrate the LEAP projectile into the Navy's STANDARD Missile and a BMDO-developed Advanced Solid Axial Stage (ASAS) third stage rocket motor. This combination provides sufficient propulsion to boost the LEAP kill vehicle beyond the atmosphere. Developments from this program will support the Navy Theater-wide TBMD (Upper Tier) program.

Last week BMDO and the Navy made its first attempt at intercepting a theater ballistic missile target outside the earth's atmosphere with the LEAP projectile and STANDARD Missile. The U.S. Navy guided missile cruiser USS Richmond K. Turner calculated the required launch conditions for intercept and launched the LEAP vehicle aboard the modified STANDARD missile. The intercept was unsuccessful. Observed deviations from the expected interceptor missile flight path during first and second stage operation may have contributed to the failed intercept. All stages of flight were executed, including the new third stage and LEAP kill vehicle deployment. Significant data was collected during the experiment and is currently being analyzed to determine the cause of the anomaly.

A cost and operational effectiveness analysis (COEA) is in progress to assess interceptor alternatives. The Theater-Wide interceptor will be integrated with the existing AEGIS Weapon System that will be modified for the Area Defense (Lower Tier) program. The $30.4 million requested will allow us to complete the COEA and continue planning, force integration studies, concept engineering and limited technology demonstrations, leading to a milestone decision in FY 1998, and if fully supported throughout development, deployment early in the next century.

Medium Extended Air Defense System: MEADS, previously referred to as Corps Surface to Air Missile (SAM), is designed for limited area defense and the protection of maneuver forces against the increasing threat of tactical ballistic missiles and air-breathing targets, including cruise missiles. The system is also designed to decrease our strategic lift requirements for TBMD systems. MEADS would be employed either in combination with other systems as part of integrated air defenses, or individually in stand alone operations.

MEADS represents an important international cooperative initiative with France, Germany and Italy. In February, Deputy Secretary of Defense John Deutch signed a Statement of Intent (SOI) with the three other partners to jointly develop and produce MEADS. The SOI calls for a program cost and workshare of approximately 50 percent for the United States, 20 percent each for France and Germany, and 10 percent for Italy. The

program will have a Project Definition-Validation Phase, a Design and Development Phase, and a Production Phase. The SOI forms the basis for a Memorandum of Understanding (MOU) with our partners that will define the details of cooperation for each phase of the development program. The first phase will be conducted by two competing American/ European industrial teams in order to determine the best concept for the program. The winning team will be the prime contractor in subsequent development and production phases. In FY 1996, we are requesting $30.4 million for the Corps SAM/MEADS program. If fully supported throughout development, MEADs could enter service in the year 2005.

Boost Phase Interceptor: Ballistic missiles, regardless of their range, are best targeted and countered during their boost phase. Boost-phase intercept affords the opportunity to hit large, extremely vulnerable rockets. Therefore, we are exploring concepts which employ airborne systems of attack in the boost phase to destroy attacking missiles over enemy territory, potentially allowing debris and the lethal payload to fall back on the aggressor. These would be particularly effective against advanced delivery system countermeasures and missiles carrying weapons of mass destruction. The primary objective of the kinetic energy boost-phase interceptor (KE BPI) demonstration program is to demonstrate an effective, air-launched boost-phase intercept capability by FY 1999. The demonstration program is structured to show that an integrated system is feasible, militarily useful, and operationally suitable, and that it has an achievable development path to eventually meet all the requirements for an operational system. Currently, the launch aircraft are expected to be the Air Force F-15 and the Navy F-14. The program is executed by the Air Force, with both Navy and Army participation. It is important to recall that our fighter pilots witnessed boosting SCUD missiles during the Gulf War. A BPI capability would allow us to leverage our tremendous tactical air capabilities. In FY 1996, we are requesting $49 million, which will enable us to conduct an Air Force/Navy cooperative concept of operations evaluation and initiate tri-Service activities supporting possible proof-of-principle flight testing of an airborne interceptor.

System Test & Evaluation We have implemented a system test concept which uses the BMC3 program and the on-going PATRIOT, THAAD and Navy TBMD programs to incrementally address the interoperability of the overall TMD "family of systems." Early system integration tests, starting in FY 1996, will take advantage of target characterization flights for data collection to demonstrate the integration of DSP, JTAGS, TALON SHIELD and PATRIOT to intercept threat representative targets. If AEGIS systems are available, they will also participate. In FY 1997 we will add a THAAD system to this scenario, with THAAD conducting intercepts and PATRIOT simulating intercepts.

This incremental integration of the TMD "family of systems" will be supported by the TMD System Exerciser, a real-time hardware-in-the-loop simulation. The TMD System Exerciser will provide pre-test assessments and post-test analyses. Our "build-a-little, test-a-little" approach will reduce risks in the system development to identify any interoperability issue early in the program. We have leveraged the TMD System Exerciser to build a similar integration tool for the NMD system, which will use a similar test concept to reduce risk and provide early information for decision-makers.

National Missile Defense

For National Missile Defense we are pursuing a research and development program that demonstrates the capability to deploy a system that could protect the U.S. from ballistic missile attack. In the next 2-3 years, functional demonstrations of a ground based interceptor, a ground based radar and the BMC3 that could comprise an initial system will be conducted. Supporting these demonstrations will be the requisite system engineering, deployment planning and risk reducing technology efforts that will allow an initial or "UOES-type" system to be deployed quickly if a threat emerges. Although this initial contingency option would protect the U.S. against relatively simple threats of limited quantity, the NMD program would also rely on spaced-based sensors, called Space and Missile Tracking System (formerly Brilliant Eyes), that could be added to an initial system to provide protection of the U.S. from limited attacks by the most modern ballistic missile systems that exist today.

During the second half of the 1980's, the technical feasibility of destroying ballistic missile warheads in flight was demonstrated with a hit-to-kill interceptor. Since then, the technologies proven by this demonstration have been further improved to the point where they are now ready for integration into system level tests involving ground-based interceptors, ground-based radars and BM/C3 system elements. Over the next 2-3 years flight tests are planned at our national test range in the Pacific to first test these elements individually and then together as a system. If successful, these tests will demonstrate that an effective and affordable NMD system can be built.

In order to protect the U.S. against existing ballistic missiles that could potentially threaten the U.S., the NMD program is based on a strategy of technology readiness. First, readiness with capability that increases incrementally to perform fully against both simple and complex potential threats. Second, readiness to build and deploy a system quickly as we see threats emerging. In the next 2-3 years, the technological capability will be achieved which could address a ballistic missile attack of only a few warheads. This capability could be operational in about 3 to 4 years after a decision is made to deploy. At the present funding level, in about 6-9 years the capability will be achieved which could address an attack of about a dozen warheads embedded in a complex of associated objects. At that time such a system could be operational about 3 to 5 years after a decision is made to deploy.

The key projects in the NMD program include a ground-based interceptor, a ground-based radar, BMC3 and sensor technology. System engineering and integration, deployment planning, phenomenology, and test and evaluation activities support the key projects.

Ground-Based Interceptor: The GBI project takes advantage of prior BMDO interceptor investments and accomplishments in order to complete development and fly the exo-atmospheric kinetic kill vehicle (EKV) portion of the interceptor in the next few years. The program's emphasis is to demonstrate early-term intercept of high-speed, long-range ballistic missiles. The EKV contractors will undergo critical design reviews later this year. EKV seeker fly-by tests are planned in FY 1997 to demonstrate seeker operation in the actual

engagement environment, and reduce risk for subsequent intercept flight tests. In FY 1996 we are requesting $126.6 million for the ground-based interceptor program.

Ground-Based Radar: The NMD Radar Technology Demonstrator (RTD) effort is developing a testbed radar to resolve critical technology issues associated with development of an NMD-GBR, and to provide the primary fire control sensor to support integrated NMD system testing at the U.S. Army Kwajalein Atoll missile test range. The effort leverages developments made under the TMD-GBR program to resolve the issues of discrimination, target object map, kill assessment, and electromechanical scan. It includes algorithm development, realtime software and hardware in-the-loop simulation, and a radar technology demonstration. In FY 1997 the existing TMD-GBR demonstration/validation hardware will be used to construct a limited field-of-view RTD with sufficient range to support NMD test requirements. Based upon the results of the NMD system testing at USAKA, a final NMD-GBR design will be completed after the turn of the century. In FY 1996 we are requesting $37.7 million for the ground-based radar program.

Battle Management, Command, Control & Communications: The BM/C3 project is focused on developing tactically representative hardware and software to integrate NMD interceptor and sensor operations in support of informed command and control (C2) decision making. The BM/C3 element is built on an open system framework that will use, where possible, existing hardware and software. As a result, the BM/C3 element will adapt to various threats, NMD architectures, contingency deployment options, and evolving operational requirements. There are three main objectives of the NMD Technology Readiness BM/C3 Program. They are to develop prototypes to validate the necessary NMD command and control structure, to develop the communications architecture for all of the information flows for the NMD Program, and finally, to serve as the vehicle for NMD Program Integration. In FY 1996 we are requesting $34.6 million for the BM/C3 program.

Other key efforts in the NMD program are needed to support the development of the major elements. The system engineering and integration effort is needed to formulate system

engineering requirements, define the system architecture and evaluate the results of tests to determine if the system engineering requirements are being met. Engineering requirements for each element are being developed in FY 1995-1996. Engineering requirements for system testing will be developed in FY 1996-1997. The contingency deployment planning effort identifies deployment activities, including schedules and costs, and the impacts of fielding an operationally effective NMD System in the shortest possible time. Because a decision to deploy can come at any time, deployment planning is a continuous process that will evolve with technical advancements in the element programs. Near term efforts focus on critical path analyses to identify those activities providing the greatest potential for reducing the deployment time.

Space-Based Infrared System

During the Summer and Fall of 1994, the Department of Defense Space-Based Infrared System (SBIR) architecture study team reviewed infrared requirements and programs to meet future infrared satellite needs. SBIRS optimizes satellite platforms at different altitudes to address the mission requirements in four areas: missile defense, missile warning, technical intelligence, and battlespace characterization. The Department approved a high-altitude now, low-altitude later integrated architecture and transferred management and future years defense program (FYDP) funding for BMDO's Space and Missile Tracking System to the Air Force.

Although BMDO is not funding SBIRS, the system provides a vital role for both theater and national missile defense. (Funding for SMTS flight demonstration is covered as part of the U.S. Air Force budget, under Program Element 0603441F.) SBIRS provides surveillance, warning and track data to support overall command and control, active defense, passive defense, and attack operations for ballistic missile defense. The low earth orbit SMTS is an integral part of a potential future national missile defense system deployment. The SMTS program is developing a Flight Demonstration System (FDS) for launch in FY 1998 to demonstrate the effectiveness of the low altitude component of the SBIRS architecture.

BMD Technology Program: A Vital BMD Program Priority

As we move forward with our acquisition programs, I am concerned that the programmatic demands on our BMD resources will continue to rise. We have been forced to compensate by reducing our technology program and this must be reversed. I would like to remind the Committee that today's acquisition programs are possible only because significant past investments in BMD technology made them possible. For instance, development of the "hit-to-kill" interceptor technology, now adopted by PAC-3 and THAAD, evolved from the SDIO's Flexible Lightweight Agile Guidance Experiment (FLAGE) technology demonstration program in the mid-1980's. The ERINT program, now the munition for PAC-3, began as a technology demonstration program following FLAGE.

The sensitive staring focal plane arrays which serve as the "eyes" for the ARROW and THAAD interceptors emerged from BMD sensor technology efforts over the last ten years. Similarly, solid state transmitter modules for Ground Based Radars that support both TMD and NMD architectures are derived from the BMDO technology-sponsored monolithic microwave integrated circuit program.

Just as these past technology investments helped enable current TMD acquisition programs, today's technology investments will prepare us for evolving, proliferating threats. Potential requirements, based on reasonable extrapolations of credible countermeasures, set the pace and direction of today's advanced technology program. As a result, next generation TMD systems will be able to draw from a set of readily available technology solutions.

We have organized the technology program to balance across several variables, including TMD and NMD applications, and technology development and demonstrations. In this regard, we have identified the most critical technology requirements for the program and are pursuing them within the constraints of the funding available for the technology program. These unique technology requirements include:

- sensor and seeker component programs to improve the range and resolution of missile defense sensor systems and interceptor seekers;
- hypervelocity interceptor component programs to develop faster, smarter, more maneuverable interceptors;
- BMC3 high data-rate and low-error advanced component technologies needed in automated decision aids, data fusion, adaptive defense operations, and secure communications;
- phenomenological research to determine how the threat, environment, and defensive system will behave and interact during an engagement; and
- research into advanced concepts, such as directed energy systems, that are capable of global coverage (i.e., accomplishing both national and multiple-theater missile defense missions), and that can engage targets in the boost-phase.

I believe that proper development of technologies to meet these critical requirements is essential to maintaining our program's technological edge. Nowhere else in the Department are basic or component BMD technology programs funded. Therefore, to ensure the continued flow of new solutions to meet evolving ballistic missile defense requirements and technology needs, I encourage the Congress to consider the BMD advanced technology program (funded at $172.6 million in the FY 1996 President's Budget) as a strategic investment. I will make sure the technology program maintains a clear focus and that its products remain relevant to the BMD mission and are of high quality. I believe this investment is critical to the continued viability of our BMD efforts.

The BMD Program and Arms Control

While I am not primarily responsible for arms control issues, my staff and I have some expertise, and great interest, in these matters. Arms control agreements have an impact on our NMD and TMD programs. I take seriously my dual responsibility to develop missile defense systems which are robust and Treaty-compliant. We carefully examine each of our experiments, as well as our systems in development, to ensure that all our efforts are Treaty-compliant.

The treaty which has the most dramatic and direct impact on missile defense is the ABM Treaty. As you know, the very purpose of the ABM Treaty is to limit missile defense to insure the effectiveness of deterrence between the United States and the former Soviet Union. As a result, there are myriad issues which arise out of this treaty. These issues have been contentious during the past year and I believe will continue to be so in the near future. I believe that, within the confines of the language of the ABM Treaty, we can and will build missile defenses to meet our national security needs. In the TMD area, I believe there is a line of demarcation between strategic and theater capability which will be agreed upon, which will allow us to develop highly capable theater missile defense systems, and yet leave sufficient space between that capability and strategic capability. Presently, the U.S. is involved in the process of establishing that line of demarcation in discussions with the former Soviet Union.

There are important differences in the positions of the sides, but also some important elements of common ground. Specifically, there is agreement that the theater threat includes missiles of up to 3,500 km -- and on the need for highly effective theater missile defenses. Restricting tests of TMD systems to missiles of that range will go a long way toward ensuring that TMD systems do not have capability against strategic ballistic missiles. The importance of this point is sometimes overlooked. As the developer, I would have significant difficulty convincing a warfighter -- or the U.S. Congress -- that a very sophisticated defensive system such as mine would have capability it had never demonstrated. ***"Trust me, it'll work"*** would not be persuasive, and no responsible commander would ever plan to rely on a missile defense system to perform a mission for which it was neither designed nor tested. The best way to build an ABM system is to build an ABM system, not to build a TMD system and hope that it will have some residual, untested capability against strategic missiles.

Again, I believe it is possible and likely that a reasonable line of demarcation will be established. Hopefully, that will be accomplished in the near future. But predictions are difficult to make.

Conclusion

The BMD program today is a focused, prudent response to the real world. We are aggressively working to meet existing and emerging ballistic missile threats, first to our forces overseas, as well as our friends and allies; and secondly the emerging missile threat to the United States. The Department is dedicated to getting "rubber on the ramp" as soon as possible for urgently needed TMD systems for the warfighter. We want to make sure that there is real protection for our men and women as they go into battle to defend our national security interests. In this regard, the preponderance of funding in this program will support the acquisition of TMD systems and hardware to be deployed throughout the remainder of this decade and into the next. When the core TMD systems are deployed, U.S. forces will be protected against short- and longer-range theater class ballistic missiles and the warheads they can deliver. Today and throughout the remainder of the decade, we are making theater ballistic missile defense a reality. We remain committed to ensuring that as new ballistic missile threats arise, highly effective defenses will be in place to protect our forces.

The Department also maintains a well-focused technology readiness program for NMD, including options for early deployment if required. This program is designed to mature the technologies critical to a defense of the United States and, once we conclude that the threat warrants such a deployment, deploy them in a relatively short period of time and at an affordable cost. When these ballistic missile threats to the United States do emerge, let me assure you the Administration is strongly committed to ensuring defensive technologies are available to meet them and to protect our Nation. We must build the right defense that can protect us against the realistic threats we will face in the future. In this regard, I echo General Ashy's contention that the "need for deployment of a national missile defense is not a question of if, but when."

Our BMD technology program represents a concentrated investment strategy. We are focusing our efforts on those technologies which are most critical to improving TMD and NMD systems and providing clear technology answers to tomorrow's threat developments.

We must continue to invest in this vital and unique portion of the program since it is crucial to the continued viability of the overall BMD program.

I look forward to working with this Committee, as well as the entire Congress, to make highly effective and affordable ballistic missile defenses a reality. Mr. Chairman, that completes my statement. I am ready for your questions.

BALLISTIC MISSILE DEFENSE ORGANIZATION

FY 1996 PRESIDENT'S BUDGET

SUMMARY

February 4, 1995

Ballistic Missile Defense Organization
FY 1996/97 President's Budget

PROGRAM OVERVIEW

OVERVIEW

The Ballistic Missile Defense (BMD) program is structured to respond to existing and emerging ballistic missile threats around the world. The program focuses its highest efforts on acquisition programs designed to defend against the ballistic missile threat that is "here and now," namely theater-class ballistic missiles. However, the program is developing Theater Missile Defense (TMD) systems that address the growing threat of longer-range ballistic missiles in both theater and strategic classes. The program continues to invest in the BMD technology base in order to enhance future BMD systems for both TMD and National Missile Defense (NMD) applications.

The TMD program consists of: near-term improvements to existing air and tactical ballistic missile defense systems; core TMD acquisition programs to meet the existing theater ballistic missile threat; and advanced TMD capabilities for the future. The TMD program addresses the existing and emerging ballistic missile threat to U.S. forces deployed overseas, as well as our friends and allies. The TMD core program consists of core acquisition programs: PATRIOT Upgrades, Navy Area Defense Program, and the Theater High Altitude Area Defense (THAAD) System. TMD in this Future Years Defense Plan also includes procurement of appropriate battle management, command, control, and communications for these theater capabilities, and provides for an FY1998 start of an acquisition program for one of the three advanced capabilities programs. The remaining systems will be sequenced within the overall planning profile with FY 2000 and FY 2004 possible starts.

In recognition of the low probability of a long-range ballistic missile attack from the former Soviet Union or China, but to preserve an adequate defense against the acquisition or indigenous development of a long-range ballistic missile capability by another potentially hostile nation, NMD efforts are focused on achieving and maintaining technical readiness to deploy in the future. This will be accomplished by emphasizing risk reduction programs, key technologies, and activities to resolve critical technical issues, as well as activities to reduce deployment timelines.

To support the TMD acquisition programs and the NMD technology readiness program and to provide for potential breakthroughs in BMD capability, advanced technologies will be supported, but at a lower level of effort than in previous years. Management and program support activities are tailored to these revised BMD objectives.

THEATER MISSILE DEFENSE PROGRAM

Core TMD programs are an enhanced version of the PATRIOT air and missile defense system, PATRIOT Advanced Capability Level-3 (PAC-3); the Navy Area Defense Program, a sea-based AEGIS/Standard Missile-2 (SM-2) Block IVA upgrade; Marine Theater Missile Defense, which includes upgrades to the TPS-59 radar and the HAWK missile; and the land-based Theater High-Altitude Area Defense (THAAD) System, to include TMD Ground-Based Radar (GBR). Additional efforts will involve concept exploration activities for a potential sea-based Navy Wide Area Defense Program, Corps SAM, and the Boost Phase Interceptor system. Due to fiscal constraints, these systems will be phased in over time beginning in FY 1998.

PAC-3 - PATRIOT is a long-range, mobile, field Army and Corps air defense system, which uses guided missiles to simultaneously engage and destroy multiple targets at varying ranges. The PATRIOT Advanced Capability Level 3 (PAC-3) Upgrade Program is the latest evolution of the phased material change improvement program to PATRIOT. The material changes will provide improved performance across the spectrum for system and threat intercept performance. The material changes include a new PAC-3 missile (previously known as ERINT), remote launch capabilities, communications and computer/software improvements, and radar upgrades to enhance system performance by improving its multi-function capability for tracking, and target handling capability against air breathing, ballistic and cruise missile threats. The PATRIOT operates as the lower tier of the Army's TMD enclave concept and is developing the capacity to interact with the Navy Cooperative Engagement Capability (CEC) system.

Navy Area Defense Program - The Navy Area Defense Program leverages the currently deployed AEGIS cruisers and destroyers equipped with the Standard missile. The Standard Missile-2 Block IVA program upgrades the Block IV with additional sensors and weapons system software to significantly improve tactical ballistic missile defense capabilities. The program includes a phased development with early integration into the AEGIS command and control structure and a series of risk reduction flights at White Sands Missile Range. A User Operational Evaluation System (UOES) is planned to allow early warfighter testing and to provide a limited deployment capability in case of national emergency.

Marine Corps TMD - The Marine Corps Tactical Missile Defense Initiative provides a basic TMD capability for the Marine Corps for interim point defense of vital assets in the amphibious operating area. This TMD capability is accomplished through product improvements to the AN/TPS-59 Radar and the Hawk missile system, and through development of the Air Defense Communications Platform (ADCP). The program is jointly funded by BMDO and the

Marine Corps. Both the AN/TPS-59 and the ADCP will have Milestone III reviews in FY 1996.

THAAD SYSTEM - Formerly termed the Upper Tier Theater Missile Defense System (UTTMDS), the combined THAAD and TMD-GBR programs are now called the "THAAD System." While modifications of existing systems deal with many theater ballistic and cruise missile threats, the THAAD system fulfills the user requirement for multiple shot opportunities to intercept theater ballistic missile threats. Multiple shot opportunities are necessary to neutralize threats carrying weapons of mass destruction at higher altitudes and longer ranges to achieve the required level of defense. THAAD provides the interceptor while the Theater Missile Defense Ground-Based Radar (TMD-GBR) provides the necessary surveillance sensor.

The THAAD Program is currently in Demonstration/Validation and undergoing a series of flight tests. The program will reach Milestone II in early FY 1997. Another key feature of the THAAD Program is the User Operational Evaluation System (UOES) to allow early warfighter testing and to provide a limited deployment capability in case of national emergency.

The TMD-GBR meets an immediate requirement for a more capable wide-area-defense radar. It provides surveillance and fire control support as an integral part of the THAAD System, and, cuing support to lower tier systems such as PATRIOT. The TMD-GBR utilizes state-of-the-art radar technology to accomplish its required functions of threat attack early warning, threat type classification, interceptor fire control, external sensor cuing, and launch and impact point estimation. In particular, TMD-GBR will be able to provide a capability to perform threat classification against tactical ballistic missiles, and kill assessment after intercept. The TMD-GBR will undergo a series of dedicated and integrated characterization tests in preparation for a THAAD System Milestone II. TMD-GBR development activities will be the basis for the NMD-GBR RDT program.

TMD C^3 - C^3 systems provide the framework for synchronizing and integrating TMD operations. TMD C^3 is considered an extension of the CINCs' existing air defense command and control structure. The acquisition strategy takes advantage of the large inventory of C^3 assets already available in the theater and maximizes the use of existing command center and communications capabilities. This approach minimizes costs and provides an enhanced early combat capability. Some modifications were required to account for the unique features of TMD. The primary focus is on interoperability and the free exchange of improved warning and surveillance data. To this end, the necessary command and control additions, such as Joint Tactical Information Distribution System (JTIDS), are being procured for TMD systems.

In addition to these modifications and developments, BMDO is

pursuing a series of advanced concepts to answer shortfalls in the core programs and to meet future threats. There are currently three advanced concept programs: Navy Wide Area Defense Program, Corps SAM, and the Boost Phase Interceptor. Although validated requirements exist for all these concepts, funding limitations have dictated a staggered development schedule with a new start scheduled for FY 1998. An advanced concept will be considered for a new start based on national priorities, maturity, capability, effectiveness, lethality, current and projected threat, operational need and affordability. If any of the three are not selected, additional research and development will be conducted to further refine the technology and manufacturing processes and to reduce cost.

Navy Wide Area Defense Program - The Navy Wide Area Defense program will provide an upper tier sea-based capability to counter the TBM threat. The program will build on the core sea-based program, the lightweight exo-atmospheric projectile (LEAP) technology efforts, and the existing AEGIS ships infrastructure. The current effort includes LEAP flight tests, an independent cost and operational effectiveness analysis, and force integration studies including concept engineering. The program will also investigate the option of using a THAAD missile variant.

Corps SAM - The Corps SAM program develops a new mobile air and missile defense system to protect Army or Marine maneuver forces against short-range ballistic missiles and advanced cruise missiles fired from any direction. Corps SAM would be more transportable, relieving tremendous demand for airlift assets early in a regional conflict. High-level discussions are being carried out with German and French officials regarding a trilateral cooperative development program (called the Medium Extended Air Defense System, or MEADS).

Boost Phase Intercept - The primary objective of the kinetic energy boost phase interceptor (KE BPI) demonstration program is to demonstrate an effective, air-launched boost phase intercept capability by FY1999. The KE BPI demonstration will perform a TBM intercept employing an operationally representative interceptor with design parameters traceable to the Air Force's Operational Requirements Document. The demonstration will be structured to include all key elements required of the eventual operational system (missile, launch aircraft, off-board sensor, and BM/C3I) integrated to the extent required to achieve a missile kill against a representative TBM in boost phase. This demonstration is structured to show that an integrated system is feasible, militarily useful, and operationally suitable, and that it has an achievable development path to eventually meet all requirements for an operational system. The KE BPI missile will be an endo-atmospheric, and probably exo-atmospheric, high-speed advanced tactical missile. Currently, the launch aircraft are the F-15 (Air Force) and F-14 (Navy). The program will be

managed by the Air Force with Navy and Army participation.

Other TMD Support. BMDO funds the engineering and support costs associated with the development and test of TMD systems. This approach results in overall reduced costs by avoiding duplication amongst the Services while pursuing standardized approaches to threat definition, countermeasures, phenomenology, test and evaluation, user interfaces, technology insertion and lethality. Centralized systems engineering and BMC3 definition insure interoperability while meeting user requirements.

Another essential part of TMD support are BMDO's International Programs with friends and allies. This type of burden sharing yields a valuable technology exchange for the U.S. in core and advanced TMD programs. As a result of the proliferation of ballistic missiles and their use in the Gulf War, many U.S. allies and friends have recognized the potential threat of missile attack, and are cooperating with BMDO through discussions, planning, and development of TMD systems. BMDO supports a cost sharing technology program with Israel, which will provide the U.S. with technology improvements and lead to Israeli deployment of the Arrow interceptor system. The U.K. has recently initiated a study to determine their specific requirements for ballistic missile defense. Moreover, in their 1994 defense white papers, the French, Germans, Canadians and Australians address the threat posed by ballistic missiles. The NATO ad hoc working group on TMD is preparing their final report after a year-long effort of finding ways to cooperate in TMD programs. The Japanese government is leading their first bilateral U.S.-Japanese TMD study as a result of their 1994 Defense Advisory Committee Report to the Prime Minister. This Report suggested the need for Japan to pursue a TMD program in cooperation with the U.S.

NATIONAL MISSILE DEFENSE PROGRAM

The NMD program is structured as an evolving Technology Readiness Program that provides a hedge against the emergence of a ballistic missile threat to the United States. This program is developing elements and performing critical system engineering and integration activities to develop and maintain system capability and reduce the lead time to deploy an effective defense of the United States homeland against a limited missile attack. To be able to defend against a ballistic missile threat, a system must have: interceptors with long range and effective threat negation capability; sensors capable of threat detection, tracking, and discrimination; and command and control, which provides rapid, coordinated, and assured threat engagements. There is no system today to defend the U.S. against ballistic missile attack. The strategy adopted for the NMD program is to plan for and develop an early ballistic missile defense

capability, which could be deployed in less than four years and be effective against relatively simple threats. At the same time, the strategy also provides for progressive and incremental development of more capable deployment options that are on a path to an objective system capable of countering a spectrum of existing ballistic missile-delivered weapons that could threaten the U.S.

Ground-Based Interceptor (GBI) - The GBI project is continuing to take advantage of prior BMDO interceptor accomplishments to develop the exoatmospheric kill vehicle (EKV). The emphasis is on demonstrating early term intercept of high speed, long range ballistic missiles. The EKV must acquire a threat cluster using commit and handover information provided by the NMD system. It must combine the NMD system data with the scene that its on-board seeker observes, use its on-board seeker and discrimination algorithms to select the lethal object, and maneuver (divert) to destroy it by force of impact. EKV seeker fly-by tests are planned to demonstrate seeker operation in the actual engagement environment, and reduce risk for subsequent intercept flight tests. The limited GBI budget will force a down select from two EKV contractors to one contractor at the end of FY1995. Each contractor will complete a seeker flight test in FY1997. The winner of the down select will fly a kill vehicle in an FY1998 intercept test.

Ground-Based Radar (GBR) - The NMD Radar Technology Demonstrator (RTD) effort is developing an ABM treaty-compliant testbed radar to resolve critical technology issues associated with development of an NMD-GBR and to provide the primary fire control sensor to support integrated NMD system testing at the U.S. Army Kwajalein Atoll missile test range. The effort leverages developments made under the TMD-GBR project to resolve the critical issues of discrimination, target object map, kill assessment, and electromechanical scan. It includes algorithm development, real-time software and hardware in the loop simulation, and finally a radar technology demonstration. The software and hardware simulations will be enhanced versions of the TMD models and executed on existing NMD data processors. The NMD-RTD will convert existing TMD-GBR Dem/Val radar hardware into a larger, limited field-of-view unit with sufficient range to support NMD test requirements. The program will develop unique NMD software to satisfy the NMD requirements and modify existing TMD operations and applications software.

Battle Management, Command, Control & Communications (BM/C^3) - The BM/C^3 project is focused on maximizing the system level performance of the NMD elements. As such, the BM/C^3 element is developing tactically representative hardware and software that integrate NMD interceptor and sensor operations to support informed C2 decision making. The BM/C^3 project is using an open system framework and has established BM/C^3 component definitions that ensure the flexibility to support NMD Technology Readiness

Program dynamics, contingency deployment options and operational requirements evolution. The Site-level BM/C^3 provides the ability to operate the integrated interceptor, in-flight data links, and fire-control radar in accordance with the Engagement Plans. The CINC-level BM/C^3 provides the vehicle for CINC command and control of NMD assets and overall direction of the ballistic missile defense capability. It also provides the capability to support extensive decision support systems and situational awareness by correlating the best available sensor and intelligence data. Inherent in this structure is the flexibility to match the evolving NMD capability.

Other NMD Support - The NMD system engineering and integration effort is focused on maximizing the system level performance through a balanced allocation and flowdown of requirements to the elements. Closely aligned to this effort, the NMD deployment planning effort is identifying required activities, including schedules and costs, and the impacts of fielding an operationally-effective NMD System in the shortest possible time.

ADVANCED TECHNOLOGY

To maintain the vitality of a BMD architecture over time, technologies that provide options for improvements to planned and deployed defenses must be developed. Among the most important technological requirements are capabilities to defeat straightforward countermeasures, to counter threat evolution, particularly advanced munitions that complicate an effective defense, to reduce the perceived advantages of weapons of mass destruction and the potential for proliferation of currently deployed theater ballistic missile systems, and to increase affordability and sustainability as users gain operational experience with deployed systems.

BMDO investment in advanced technology continues, although at a level substantially below that of past years. This investment provides component technologies to improve performance or reduce cost for our acquisition programs, an understanding of physical processes to support the acquisition programs, and technical solutions to mitigate unforeseen threats.

To meet future needs, advanced technology programs are investing in high leverage technologies that yield improved capabilities in kinetic energy interceptors and advanced sensors. Directed energy systems are being brought to an orderly conclusion in FY 1997. Innovative sciences are investigating new ideas and technologies to missile defense.

Potential high payoffs of the Advanced Technology Program include continuous theater presence that provides defensive capabilities against surprise attack and during the early stages of rapidly escalating conflicts, exo- and endoatmospheric intercepts with a high probability of kill at lower cost that

expand battle space, enlarge defended areas, and overcome simple countermeasures, fused multi-sensor detection and tracking that extend through the missile flight path, and identification and discrimination that support assured targeting.

SUMMARY

In summary, the BMD program is a focused, prudent response to the existing and emerging ballistic missile threat to the United States, our forces overseas, and our friends and allies. The Department is dedicated to getting "rubber on the ramp" for urgently needed TMD systems for the warfighter. In this regard, the BMDO budget will fund the acquisition of TMD material and systems to be deployed throughout the 1990's. When the core TMD systems are deployed, U.S. forces overseas will be protected against the full spectrum of short and longer-range theater-class ballistic missiles. Meanwhile, BMDO is committed to maintaining a well-focused technology readiness program for National Missile Defense, including early deployment options if required. The Department remains committed to ensuring that as new ballistic threats arise, highly effective ballistic missile defenses will be in place to defend our forces as they go in harm's way. In addition, as new ballistic missile threats to the U.S. develop, the Department is committed to ensuring defensive systems are available to meet the threat.

APPROPRIATION SUMMARY
($ IN THOUSANDS)

Program Name	Budget Activity	FY 94* Actual	FY 95* Estimate	FY 96 Estimate
RDT&E				
0602173C Support Technology Exp Dev	2	70,160	84,005	93,308
0603173C Support Technology ATD	3	252,862	134,402	79,387
0603861C THAAD System Dem / Val	4	710,093	651,901	576,327
0603863C HAWK Dem / Val	4	29,629	26,800	23,188
0603864C TMD-BM/C^3 Dem / Val	4	12,617	20,009	24,231
0603865C PAC-3 Dem / Val	4	77,584	0	0
0603867C Navy Lower Tier Dem / Val	4	150,446	139,676	0
0603868C Navy Upper Tier Dem / Val	4	81,000	68,450	30,442
0603869C Corps SAM Dem / Val	4	16,270	14,971	30,442
0603870C BPI Dem / Val	4	37,022	40,000	49,061
0603871C NMD Dem / Val	4	549,973	386,988	370,621
0603872C Other TMD Dem / Val	4	272,388	386,368	460,470
0604864C TMD-BM/C^3 EMD	5	0	534	14,301
0604865C PAC-3 EMD	5	42,097	276,283	247,921
0604866C PAC-3 Risk EMD	5	97,000	74,000	19,485
0604867C Navy Lower Tier EMD	5	0	0	237,473
0605218C Management	6	205,948	163,206	185,542
Total RDT&E		2,605,089	2,467,593	2,442,199
Procurement				
0208863C HAWK Procurement	~	0	3,804	5,106
0208864C TMD-BM/C^3 Procurement	~	0	0	32,242
0208865C PAC-3 Procurement	~	120,115	253,272	399,463
0208867C Navy Lower Tier Procurement	~	0	14,394	16,897
Total Procurement		120,115	271,470	453,708
MILCON				
0603871C NMD	~	2,977	530	832
0603872C Other TMD	~	0	0	2,577
0604861C THAAD System	~	0	0	13,600
Total MILCON		2,977	530	17,009
BMDO Total		2,728,181	2,739,593	2,912,916

*Represents Modified PE Structure As Used By BMDO in FY 96

mj-50500 / 013095

APPROPRIATION SUMMARY
($ IN THOUSANDS) (Cont'd)

Program Name	Budget Activity	FY 94* Actual	FY 95* Estimate	FY 96 Estimate
RDT&E Total By Budget Activity				
Exploratory Development	2	70,160	84,005	93,308
Advanced Development	3	252,862	134,402	79,387
Demonstration / Validation	4	1,937,022	1,735,163	1,564,782
Engineering And Manufacturing Development	5	139,097	350,817	519,180
Management Support	6	205,948	163,206	185,542
BA Total		2,605,089	2,467,593	2,442,199
BMDO Total By Congressionally Mandated Program Element Structure				
BPI	~	37,022	40,000	49,061
Corps SAM	~	16,270	14,971	30,442
HAWK	~	29,629	30,604	28,294
Management	~	205,948	163,206	185,542
Navy Lower Tier	~	150,446	154,070	254,370
Navy Upper Tier	~	81,000	68,450	30,442
NMD	~	552,950	387,518	371,453
Other TMD	~	272,388	386,368	463,047
PAC-3	~	239,796	529,555	647,384
PAC-3 Risk EMD	~	97,000	74,000	19,485
Support Technology	~	323,022	218,407	172,695
THAAD System	~	710,093	651,901	589,927
TMD-BM/C^3	~	12,617	20,543	70,774
BMDO Total	~	2,728,181	2,739,593	2,912,916

*Represents Modified PE Structure As Used By BMDO In FY 96

mj-50501 / 020295

BALLISTIC MISSILE DEFENSE ORGANIZATION
RDT&E EXECUTING AGENT DISTRIBUTION

TY $ In Thousands

Executing Agent	FY 94	%	FY 95	%	FY 96	%
DNA	10,898	0.4	1,838	0.1	9,411	0.3
NTB / NTF	73,713	2.7	51,655	1.9	52,870	1.8
BMDO	437,876	16.0	365,713	13.3	449,320	15.4
U.S. Air Force	234,795	8.6	158,492	5.8	187,804	6.4
U.S. Army	1,652,872	60.6	1,861,420	67.9	1,822,225	62.6
U.S. Navy	317,024	11.6	299,675	10.9	390,972	13.4
USSPACECOM	1,003	<0.1	800	<0.1	314	<0.1
BMDO Total	2,728,181	100.0	2,739,593	100.0	2,912,916	100.0

mj-50502 / 013195

Mr. HUNTER. Thank you, General O'Neill, and the Chair will pass the first round of questions and will recognize Mr. Weldon, the chairman of the R&D Subcommittee.

Mr. WELDON. Thank you, Mr. Chairman and thank you, General O'Neill, and as you know you are among friends here on both sides of the aisle. There is a commitment here to work with you and I want to reiterate the comments of my friend, Mr. Spratt, when he said that we appreciate your leadership. We have confidence in you and what you are doing and our goal is to work with you and give you the support that you need from the legislative body.

General O'NEILL. Thank you, sir.

Mr. WELDON. I do have to raise a question about your budget statement from the last fiscal year, however, and would ask you to respond to a quote you made; and this is in the testimony you gave May 24, 1994, to the Senate Committee on Appropriations.

I would like to point out that fiscal year 1995 is a critical year for ballistic missile defense programs. Last year, the program absorbed a severe budget reduction. Quite frankly, it has cut the BMD program to the bone. If the Department is going to field effective theater missile defenses by the end of this decade,

which most of us on this committee aggressively support and protect—that is my comment I added—

and protect the option to develop defenses for the United States this program cannot sustain reductions.

If you look at the budget request that you were talking about that year, it was supposed to have come in at $3.2 billion from what had been a cut to $2.7 billion. Actually, what you got, if I am not mistaken, was $2.9 billion and, in fact, the request for this next year is exactly the same, identical.

If that was cutting BMD to the bone, are we now cutting it to the marrow? It seems to me that we are going below what even you, who has the confidence of both sides of the aisle, felt was absolutely the bottom line in terms of what you would need to effectively respond to the threat that is out there.

We want to give you the resources you need and we want to work with you, and later on we will explore what you would do if you were given additional money. But I am troubled by what I think is some disparity between the budget number last year and this year.

General O'NEILL. The budget number we went in for last year, $3.2 billion, was cut significantly in Congress. What we received was, as I recall, $2.7 billion. And then if you add the additional moneys that are in the Air Force for Brilliant Eyes, you are up over $2.8 billion. That was certainly not our request, and it was not at that time our plan for the outyears.

But when we put together our strategy for the future program, we looked at the goals of the bottom-up review, we looked at the very poor record we had in selling the Congress on our program. We had lost hundreds of—excuse me, hundreds of millions of dollars every year that we had defended the program; and in discussions with both the Comptroller and the Deputy Secretary of Defense [DEPSECDEF], we have understood that unless we could make a story different from the story we had made to Congress in past years, we would probably suffer another cut.

In our discussions, it was felt that starting at $2.7 billion, which is what I had in my budget, trying to jump too rapidly into a $3 billion budget level was too much to ask Congress without significant risk to the loss of that program. When you look at the money you ask for as ballistic missile defense, you have to understand that if you do not get it, it does not mean that the Air Force, the Navy, or the Army is going to be given it. It is just going to be gone out of the defense budget, and so you have to be very careful about what you ask for.

So we decided to ask for what we thought was an increase over 1995. We asked for $2.9 billion; I felt at the time that that would be sustainable. I thought I could make the arguments to Congress. That does not include the money that is in the Air Force program, so if you add the money that is in the Air Force program, you are over $3 billion.

So we felt that that was the most appropriate way to go forward in the program, keeping the goals of the bottom-up review in mind, keeping enough money in national missile defense for a technology readiness program—not a development or deployment program, but a technology readiness program—and sustaining the core programs in our TMD area and providing for a later initiation of advanced TMD capabilities. We felt we could do that at the $2.9 level.

Mr. WELDON. Thank you. There are many questions I want to pursue, so I will only do one other line of questioning; and then I will pass on to other members and come back for a second round, Mr. Chairman, if we are going to have that allowed in this session, which I hope we will.

Many of us are going to question about theater missile defense, which I think, as I said earlier, most of us on this committee, if not all of us, support. I want to talk about—and both cruise missiles, which I think are a major problem we have to deal with, and the fact that 77 nations now possess cruise missile technology, over 20 can build them. But I also want to ask you a hypothetical question.

I am not going to ask you to confirm or deny the reports that have surfaced in this country that the Russians attempted to make available the SS–25 architecture to Brazil. As we all know, the SS–25 is a mobile launch system with three missiles, without three warheads, and presents, at least in my opinion, one of the greatest threats not from Russia, but from another nation being able to obtain that type of technology.

Now, if in fact, as the reports have in fact occurred, the Russians were to make available the SS–25 technology that they call their start launcher for space launch efforts, how quickly could that be converted back into the capability to send a missile with a nuclear warhead to any one of three cities in this country and what type of protection do we have to deal with that threat today?

General O'NEILL. Well, sir, the technologies that the adversary would have to master, beyond having a launch vehicle, would be the technologies of weapons of mass destruction. You would have to assume that he could get his hands on a nuclear, chemical, or biological weapon.

With that assumption, if that is true, then he would have to know how to get the weapon to a point on the ground about the

size of a city, that is, 1, 5 to 10 kilometers, across thousands of kilometers. That would demand he understand inertial guidance fairly well.

There are some nations that have worked in that area. One is North Korea. So if you talk about the North Koreans, I think in terms of inertial guidance, they would probably know how to get it to a point on the ground.

The other thing that provides a challenge is reentry. If you do not protect that weapon, whether it is chemical, biological, or nuclear, well enough, it just burns up like a cinder when it reenters. So there are some other things that that nation would have to know, but they are the kinds of things that with the intellects we have around the world in all of our countries, with the physicists and the engineers that we have of all makes, I don't think that is an undoable kind of scenario. I would be very concerned if this country had an equivalent SS–25.

Mr. WELDON. What would be our response?

General O'NEILL. Well, our response would be to take any counterproliferation steps we could diplomatically to—I, of course, am not a policy person.

Mr. WELDON. I won't ask you to answer that question.

General O'NEILL. In terms of active defense, we have no active defense against that system. Certainly a TMD system would not be capable of that many.

Mr. WELDON. I will ask one final point about the Taepo Dong 2 missile, which reports indicate could have a range of well over 5,000 kilometers. If launched from bases in North Korea, I assume it could attack targets throughout northeast Asia and perhaps Guam and Alaska.

Mr. HUNTER. If I could interrupt the gentleman for 1 minute, we are going to have some votes, apparently with a fairly short interval in between. I am going to go vote now. I would ask the gentleman from Pennsylvania to ask his question, take over the chair and continue the hearing until a couple of others return and then we will just keep going.

Mr. WELDON [presiding]. North Korea is known for its willingness to sell their sophisticated and destabilizing military hardware, particularly missiles, to rogue nations. If the Taepo Dong 2 missiles were sold to Libya, for example, practically every European capital, and certainly United States military bases in Europe, would be threatened.

What is our position and our response to Taepo Dong 2?

General O'NEILL. The Taepo Dong 2, were it within the scope of the performance parameters that we are designing our TMD systems to, we would be able to handle it without any problem. We are designing our TMD systems to a threat which, on the high end, is the CSS–2, which is about a 3,000- to 3,500-kilometer system. So as long as the Taepo Dong 2 falls into that venue, there would be no problem.

Mr. WELDON. What if it is at the 5,000 kilometer?

General O'NEILL. If it is at the 5,000-kilometer range, we would not have designed nor tested our systems against that kind of a threat.

Mr. WELDON. So, in effect, if they implement a Taepo Dong 2 and engage it and they have the capability of 5,000 kilometers, then portions of Alaska or Guam could be at risk; would be or could be?

General O'NEILL. Yes.

Mr. WELDON. Thank you.

Mr. Skelton. He is not here.

Mr. Spratt.

Mr. SPRATT. Just a couple of questions about things that are likely to be topical this year, General O'Neill.

Last year we had a debate about the Navy's Upper Tier. As I said in my opening remarks, I think given the limited resources you have just talked about, $3 billion plus is still a lot of money in my book, but it is not enough to do everything that everybody would like to do.

Where does Upper Tier fall in the total scheme of things? Is it complementary to or redundant to what you are doing in the area of THAAD or PAC–3? How do you prioritize the money for Upper Tier?

General O'NEILL. Sir, certainly the priority right now for Upper Tier elements is with THAAD. That does not necessarily mean that THAAD, in its final manifestation, is better than Navy Upper Tier, but THAAD went in the door first, satisfied an urgent requirement for high-altitude, wide-area defense.

What the Navy Upper Tier brings to the table is the mobility of the fleet around the world, the ability of the fleet to lay off the coast of a country over the horizon and provide friendly protective fire in support of one of our allies or in support of our operations of an amphibious nature. The Navy is often there alone and first, and as a result, when we started our discussions with Admiral Hood and others in the Navy about the potential for Navy Upper Tier, it opened up a whole new book of things that we could do with the Navy.

One of the things you have to understand is that this, again, would be a product improvement to a system for which we have already invested $42 billion. We have invested a major amount of our DOD resources in the AEGIS fleet. It is an incredible system. It has the best fire control system I have ever seen. It has tremendous growth potential, tremendous capability in terms of radar, computing.

The advantage, of course, that the Navy has is they can carry thousands of tons of stuff into combat. So they have these vertical launch tubes into which you can put defensive weapons like ours, or offensive weapons like Tomahawks, and you can pick and choose. For one mission, you can go with all Tomahawks; for another mission, you could go with all missile defense systems.

So we embarked within the last couple of years on a program to look at the Navy Upper Tier and look at a suite of potential competitors, ideas that would fulfill the requirements for this Navy Upper Tier. They included the THAAD itself.

The THAAD had already started its demonstration phase, and one of the things we required in the THAAD contract was that the missile actually fit in a VLS tube. That was one candidate. The problem with the THAAD, however, was that it has fuels in the front end, the maneuvering end of the THAAD, that are hypergolic

and very dangerous for storage aboard ship. They are rejected out of hand in the safety manuals for Navy ships, so we would have to have waivers of safety.

That is something that Admiral Hood was not real happy to have to face, but he is looking at it as a tradeoff, and we are also looking at things we could add to THAAD to make it less dangerous.

Mr. SPRATT. Does THAAD have longer legs than the standard would have?

General O'NEILL. No. No. As a matter of fact, what you could do with either system is, you can provide a kick stage, which could get it out and give it long legs. The longest legs would be the standard missile with a kick stage on the front, a third stage, which we call the advanced axial propulsion stage.

Mr. DELLUMS. Would the gentleman yield briefly before you leave the Navy Upper Tier? I would like to try to establish some factual context here.

Mr. SPRATT. Yes, sir.

Mr. DELLUMS. Is it not the case that the Navy Upper Tier at this point is a demonstration, in the demonstration phase, it is not yet a program? You have not charted out a direction, as you have with respect to THAAD. And is it not also true that there was a recent test in the demonstration phase that failed in the Navy Upper Tier? Because a number of my colleagues wanted to rush quickly to judgment to put more money in it.

It seems to me at a point where you have one test failure and you are at the demonstration phase and not at the programmatic phase, it seems to me it is not quite a fiduciary act to want to just throw money into the program. Maybe I am mischaracterizing it, but I would like to establish the factual context here for a moment.

General O'NEILL. Well, sir, you are correct in that the Navy Upper Tier is not in acquisition. We are still trading off potential options for Navy Upper Tier and, in fact, the program that you referred to is a demonstration program. It is a standard missile with this axial stage and the (LEAP), the lightweight action excel atmospheric projectile. It is a demo.

Mr. SPRATT. Can the standard do the acquisition or the terminal guidance by itself or does it need an off-board sensor to home in on the target?

General O'NEILL. No, the upper stage, the guided stage is autonomous and is thermally guided, passively guided. In terms of what happened in the test, the demo, if you would like, sir, I can have Admiral Hood provide details. He was at the range not on the ship. He was at the range and watched the test. Would that be appropriate?

Mr. SPRATT. Certainly, yes, sir.

Mr. DELLUMS. I don't know how much time we have. I think it is important to establish the record here because this is an important area we want to go into. What kind of time do we have, Mr. Chairman?

Mr. SPRATT. I would like to get the answer, but let us see how much time we have.

Admiral HOOD. The test was conducted last Saturday morning. The target was launched on a normal trajectory and flew exactly where we expected it to go. The missile was launched with correct

initial conditions, that is, the launcher pointed it in the correct direction. The second stage fly-out of the missile was much higher than normal.

The second stage now is part of the tier missile system, not what we were testing. We were testing the third stage and the kill vehicle. That second stage placed the third stage in an incorrect position. The nose cone was ejected. The third stage was ejected, and that axial advanced solid axial stage motor, that General O'Neill spoke of, attempted to correct for that error in the second stage. The kill vehicle was ejected.

It acquired the target at almost 2½ times the range that we anticipated it should have been able to acquire of the target and homed on the target. But since it was so far out of position, it could not reach it.

We do not know yet why the second stage fly-out was incorrect. The data analysis thus far has led us to believe that there was some incorrect data in one particular location in that second stage guidance computer. We are pretty sure we know what happened now. I cannot tell you today why that happened. As a matter of fact, when I leave this hearing, I will go back to join the data analysts who are still pouring over that. We will meet again tonight.

Let me emphasize that the test articles, this third stage rocket motor and the kill vehicle performed correctly. We did not put it in the right position. We are very pleased with that and as a matter of fact, we accomplished adding up our 42 objectives. We accomplished 38 of them.

I have not yet altered the plans for the next phase of the experiment. That is called flight test vehicle 4, which is scheduled for the 21 of March. But based on this ongoing data analysis, I will probably make that decision tonight or tomorrow. But we are very pleased with how the new equipment operated.

Mr. DELLUMS. Thank you.

Mr. HUNTER. Thank you. And since I got back at the last, in this funny system we have, we apologize for our schedule today that interrupts us in the middle of some very important questions, but let me just suggest—I understand you were talking to my colleagues about the upper tier experiments that were on again, off again. You did undertake the experiment ultimately and had a modicum of failure, if you will.

Let me just make a suggestion and ask you a question to follow that. I think that we have been in a highly political world with missile defense, and as in any other area, there has been, at least in my estimation, with respect to Department of Defense [DOD] in general, a recalcitrant to test when there is attendant publicity and possible setbacks in programs. I think that our policy with this, the majority in the House, and I think a number of Members on the Democrat side also, is to heavily test these systems, to test, accept failure when you have failure, fix them and test again.

I followed to some, in some detail the initial attempts to make this upper tier test and the problems of initially you had a transponder problem at one point. You had another problem that came along and I think the message that gives us is, these doggone things are complicated.

Admiral HOOD. Yes, sir.

Mr. HUNTER. And you cannot develop systems where you have 6 months, 8 months, 10 months expiring between tests. That is how we develop systems over 20 year periods, roughly five times as much time as it took us to win World War II, instead of several year periods.

I would suggest that our policy is going to be, and the policy you may see emanating from this committee, is to test the torpedoes, damn the press, but move ahead and get to the point we can develop where we have confidence in our system. As Lee Trevino said, I get confidence from practicing. When I can't practice, I don't have confidence. And maybe that goes with training, too. It probably relates also to testing of systems.

So let me just ask you, and you may have answered the question already, Admiral, but as I recall, we had two aborted tests, two delayed tests, if you will, delays in testing, then you had the test. What date was that?

Admiral HOOD. The test was conducted Saturday morning.

Mr. HUNTER. When are you going to go up again.

Admiral HOOD. We are still scheduled for the 21st of March right now. As we analyze the data on the tests from last Saturday I may have to adjust that a few days in order to make any corrections in this guidance computer that did not perform as we expected.

Mr. HUNTER. What do you have planned after that?

Admiral HOOD. After that, the program drops back into the cost and operational effectiveness analysis and some other ground experiments.

Mr. HUNTER. What I would suggest is we may want to have an accelerated test program, a continuing test program, and let me ask this question, since this trick worked and I got almost everybody out of the room except just me and a couple other members who were too smart to fall for it. Let me ask you. You said, General O'Neill, that you think you have enough money with the Clinton budget to "sustain the program." A number of us want to accelerate the program. I think you are going to see that policy manifest in the authorization.

What can we do to expedite, first, the theater defense programs? The core programs you mentioned, to expedite those? What are we looking at in terms, in general terms of cost? And, second, what can we do to expedite the National Missile Defense Program to make it a more credible program, and what would you recommend to do that?

If you could answer first, and then the other gentlemen could join in or offer their views, that would be excellent.

General O'NEILL. Yes, sir. Well, again, as I said earlier, I think we do have a program that is salable, explainable, and protects certainly the core. If additional resources were allocated to the core, I would certainly want to increase testing. I would certainly want to increase the amount of risk reduction, risk mitigation activities that I have under way.

One of the ones that has come up is in the Patriot area, where we do have risk mitigation involved because of concerns about the cruise missile threat, the advanced cruise missile threat, things like that.

So in order to make the PAC–3 and the Navy Lower Tier and THAAD be all they can be, we could certainly spend additional resources. I would want to make sure——

Mr. HUNTER. How about Navy Upper Tier.

General O'NEILL. Navy Upper Tier is not in the core, sir. Navy Upper Tier is an advanced capability.

Mr. HUNTER. It was in the Bottom–Up Review.

General O'NEILL. No, it wasn't. Let me explain what came out of the Bottom–Up Review. I did not participate in the Bottom–Up Review because I was emotionally involved, so I didn't participate. But when the results of the Bottom–Up Review came to me, they came to me in the following way.

There were three core programs identified, and those core programs were Patriot, Navy Lower Tier, and THAAD. There was a recommendation made that there be two new starts by the Bottom–Up Review.

First, new start would be Navy Upper Tier. It was not recommended it was a core program, but it needed to be started in the time frame fiscal year 1995. And then a second new start in the time frame fiscal year 1999 was going to be Corps SAM, which was the second one.

Well, what was not considered during the Bottom–Up Review was the Air Force's initiative on boost-phase intercept, which arrived on the scene about the same time as the results of the Bottom–Up Review were coming out. So what I had was three follow-on system concepts.

On top of the three concepts, Navy Upper Tier, Corps SAM, and boost-phase intercept, I was hit with a $1.1 billion cut within a few days of the time the Bottom–Up Review came out.

So the people who sat on the Bottom–Up Review said, General O'Neill needs $18 billion to do this. When it came to me, they said, General O'Neill, you have $16.9 billion, what are you going to do? What I looked at were the three pieces of the program. TMD was funded at, nominally, $12 billion over the 5 years; NMD at $3 billion, and technology, plus all the support, the salaries of all the people working in the program in the Army, the Navy, the Air Force, all the out-of-house stuff we fund, was at $3 billion, including all of your technologies, directed energies, space-based interceptors, all that stuff.

I could not see taking that $1.1 billion out of either national defense or technologies. So I went to Dr. Deutsch and said, the only place I can take that $1.1 billion is out of your top priorities, sir, TMD. And the way I will do that is I will not initiate the Navy Upper Tier in 1995, because, for one reason, I don't think we are yet ready to start it in 1995, because we are in a technology demonstration mode for that program.

So what I would like to do is to push that decision off for a couple of years and evaluate, at the same time, this new concept that the Air Force just came in called boost-phase intercept, so we can look at boost-phase intercept, Corps SAM, and Navy Upper Tier and decide which is the one that needs to go first. Because I don't have money for a new start other than in the time frame 1998.

So that is kind of where we have it.

Mr. HUNTER. If you would then go back to the original question, what would you do to accelerate those programs, I take it your answer is one thing you would do is do more with Navy Upper Tier.

General O'NEILL. Yes, sir.

Mr. HUNTER. If you had more money.

General O'NEILL. Oh, yes, sir, no question about it.

Mr. HUNTER. So you would test more and what else would you do with respect to the core programs and Navy Upper Tier.

General O'NEILL. Well, with the core programs and Navy Upper—if you look at Navy Upper Tier, what I would like to do is get a better understanding of the option space. One of the things I would like to know unequivocally is whether the LEAP approach is the best approach. And the best way to do that is to do a little more work on seeing what THAAD could do in the modes of Navy Upper Tier.

So what I would do is do more testing of the LEAP technologies. We have two different kinds of interceptors for lightweight exo-atmospheric projectile [LEAP]. I would like to assess both of those better, and I would also like to look a little bit more at how fast [THAAD] can go, and whether THAAD, theater high altitude area defense at this higher velocity, can still perform all the functions it would have to perform both within the atmosphere and outside the atmosphere.

One of the advantages that the THAAD brings is it is endoatmospheric and exoatmospheric. So if it has to chase the target down to about 20,000 feet, it can do that. Whereas the LEAP, right now, cannot chase anything down below about 60 kilometers. So that is a fundamental limit to the capability.

But I would like to thrash all that out and that could take additional resources, yes, sir.

Mr. HUNTER. Could you answer that for the record perhaps more thoroughly? What would you do to accelerate both theater defense and national missile defense?

General O'NEILL. Yes, sir.

Mr. HUNTER. And let me yield to the gentleman from South Carolina has not offered his question yet. Mr. Spratt is recognized.

General O'NEILL. Sir, I didn't answer the second half of your question about NMD, but I can wait.

Mr. HUNTER. Yes, you can. Why don't we wait until we get a first round, then I will stick around and get that answer. And Mr. Spratt is recognized.

General O'NEILL. Fine.

Mr. SPRATT. General O'Neill, I am sure that before the markup of this bill is over, we will be looking at least at the possibility of plussing up your account and one of the issues will be where we put the money. If we could go back to Navy Upper Tier, what is the request this year for Navy Upper Tier? What does it do and how, again, does it fit into the total scheme of things you have planned.

General O'NEILL. Sir, the request for Navy Upper Tier is around $30—it is $30.4 million. And what it does is it wraps up the results of the testing that has been just consummated, the two tests, FTVs 3 and 4. It completes the COEA, the cost and operational effectiveness analysis, and there are dollars, we think, in there to fund one

additional test, test, FTV No. 5. But we are very close to being marginal at that area.

But at $30 million for fiscal year 1996, that is where we are. One of the reasons that we have not funded it more robustly is we are not resourced for a new start, a program entering acquisition, until fiscal year 1998. So we have time in the Navy Upper Tier area.

Mr. SPRATT. The THAAD. When is your anticipated decision to put THAAD into a production procurement mode.

General O'NEILL. Yes, sir, the THAAD Program is in demonstration validation right now. It is moving toward an engineering manufacturing development decision in fiscal year 1997.

Mr. SPRATT. Fiscal year 1997. That is for milestone three.

General O'NEILL. That is milestone two.

Mr. SPRATT. Milestone two.

General O'NEILL. Production would be in about 2000 and first unit equipped would be late 2001 or early 2002.

Mr. SPRATT. Is that schedule constrained by funding at all? I mean, if more money were forthcoming, could you accelerate the development of THAAD?

General O'NEILL. I think we could. I would like——

Mr. SPRATT. I know anything can be rushed and pushed forward, but are you measuring the pace of the program to accommodate your funding realities?

General O'NEILL. I would like, I don't like to throw the ball over without Dick thinking about it, but General Black is my expert on THAAD and I would like him to have a chance to say something. I can always refute him, I guess.

Dick.

General BLACK. Sir, the THAAD program, as you know, is on a very accelerated schedule for development program. It is about as fast as we could go. However, last year we did take about a $60 million cut. And because of that $60 million cut, we slid out to the right the purchase of the quote "UOES" missiles that would give us a limited contingency capability.

So the first thing that I would do with additional funds relative to the THAAD program would be to buy back that earlier capability for the user-operational evaluation systems [UOES] missiles. But as far as the development program, to get to a full operational capability, we are pushing just about as fast as we can go.

Mr. SPRATT. And the initial operational capability [IOC] is year 2000.

General BLACK. 2002.

General O'NEILL. We call that first unit equipped. The operator determines the IOC. As the developer, I determine when I deliver the hardware. So it is first unit equipped 2002.

Mr. SPRATT. I will have an opportunity to ask questions because we will pass it back around again, so I will yield my time to others and come back for questions, if that is okay, Mr. Chairman.

Mr. HUNTER. I thank you, Mr. Spratt. And I am going to yield to my friend from Missouri, but first I take the perogative of the Chair to say, along with the Hunter in Congress there are two very smart Hunters, my older brother, Dr. Bob Hunter, and my younger brother, Dr. John Hunter, one of whom built what was arguably the most powerful laser in existence at one time; and John Hunter,

who built, if you watched CNN on Air and Space and saw the front cover of Air and Space Weekly, you saw the biggest gun in the world, which was built by Dr. John Hunter. And he has his beautiful wife Heather Hunter, my sister-in-law, who is here, along with Emma, who teaches Sam and Duncan Hunter how to play fair.

Let me now recognize the gentleman from Missouri, Mr. Skeleton.

Mr. SKELTON. Mark Twain once said the more you explain it to me, the more I don't understand it. Could you, General O'Neill, so we can really see these things of which we speak, give us an encapsulized version, the family tree of each of the systems we are speaking of today so we can be a little more clear in what we are doing?

General O'NEILL. OK, sir. I would be happy to.

The Patriot family tree is, of course, or the Patriot PAC–3, which is the most modern ballistic missile and cruise missile defense system that will hit the field for the combat force before the turn of the century as an outgrowth of the Patriot system, which was developed in the late, started in the late 1960's and was developed and started fielding, I think in the late 1970's, 1979 I think it was fielded, It is an air defense system for the ground force. It was bought by the Army. It was not bought by the Marine Corps because it was a little bit heavy. Weighted and outsized. So it is an army system.

It has a capability, a significant capability. I don't want to go into the classified numbers, but you are talking for aircraft protective ranges over 100 kilometers.

What we are doing is we are making it, as the Army says, be all it can be. It turns out that the Army was smart enough and the contractor, Raytheon, was smart enough to build significant growth potential in that system. So that when it came to needing something for Desert Shield, Desert Storm, the Army only had to change some software in the radar and the fuse in the missile and Eureka, it had a limited, limited capability but, at the same time, the only capability the world had to defend against the scud.

So the family tree of Patriot PAC–3 is very robust, very capable, and we are very confident that the PAC–3 will be able to do everything it can do. And what we are talking about is significantly enhanced performance over what we had in Desert Storm, including significantly greater lethality because we will be introducing with PAC–3 a hit-to-kill weapon.

For your information, sir, the technology for that hit-to-kill weapon did not come out to have Army—well it did come out of the Army, but by way of the strategic defense initiative. One of the programs that the SDI had the Army doing was a program called, it started as small radar homing interceptor technology and what it was using was the Air Force ASAT technology. So what we have done is the parentage of these systems, there was a marriage between SDI technologies and army tactical technologies to allow Patriot to be all it can be.

We are doing the same thing on the Navy side with AEGIS. I mentioned while you were out the tremendous capability that AEGIS brings to the battlefield from the sea. And of course that

is the new strategy of the Navy. The Navy does not worry quite as much about fighting the blue water battle because they appear to be the biggest guy out there right now and not too concerned about it, but we need help on the literal, we need help on the beach and we need help on the battlefields and the Navy is now in a position where they want to provide that capability and AEGIS is a tremendous boon to what we have. And the parentage of the Navy Lower Tier and the Navy Upper Tier is, again, a marriage between what the Navy brings with their ship, with the crew. We do not need any more crew Members or a different ship. We use the same launch can tubes we just, put a different little thing in it, a missile.

The parentage of that missile comes out of the old SDI program. Because what we are going to use is LEAP, potentially. Well, LEAP, lightweight axial projectile, was developed in the days of SDI as an exoprojectile from either a ground launch missile or a space-based system. So what we have is that marriage again between what the tactical Navy has been doing very well for all these years and an SDI technology and how that SDI technology can make the Navy's system be all it can be.

I had a commander in my office who worked for me, a naval commander, came to work for me. He had been the XO of a cruiser in the Persian Gulf. And he said the most frustrating thing in his life was sitting there and watching those ballistic missiles fly over the top of his ship, because very often they would fly out over the gulf and then back into Tehran. And he said, I am sure I saw that missile that killed Congressman Murtha's National Guardsmen. He said, here I was on the most modern air defense system in the world, incapable of engaging a target that I could see on my radar. He said I don't ever want to be in that position again, sir.

Mr. WELDON. Would the gentleman yield on that point?

General O'NEILL. Say it again.

Mr. WELDON. I want to reemphasize what you are saying. In effect, we have limited the capabilities of technology we already have that could have helped us tremendously in terms of the use of the Patriot system and the use of potentially space-based sensors to help us in terms of detecting and directing defensive weapons.

I would like to also ask the question about the Patriot, which you explained. Isn't it true, general, we dumbed down the radar system on the Patriot?

General O'NEILL. We dumbed.

Mr. WELDON. Dumbed it down.

General O'NEILL. Made it less capable?

Mr. WELDON. Yes.

General O'NEILL. Not to my knowledge, sir.

Mr. WELDON. We did not limit the capability?

General O'NEILL. Let me say that when, as a young officer, I participated in the source selection for the SAM–D system, which became Patriot, and when SAM–D was first sold to the Army the idea was it would go after missiles, aircraft, helicopters, everything. There was a change in the system and I think that is what you might be talking about.

General BLACK. Could be.

General O'NEILL. In the time frame 1972 because of the treaty.

Mr. WELDON. That's right.

General O'NEILL. To ensure that there was no potential conflict.

Mr. WELDON. With the treaty.

General O'NEILL. There were potentially. But I don't know what happened in that time frame. I have no knowledge of that.

Mr. HUNTER. OK.

General O'NEILL. Dick, can you——

Mr. HUNTER. Mr. Bartlett, gentleman from Maryland, is recognized.

Mr. BARTLETT. Well, thank you very much. I would like to use a rather pedestrian analogy to ask a question so that you will know how to frame the answer.

I think that almost anyone would agree that the risk of their home burning down tonight is somewhere between highly unlikely and unlikely and yet every one of us has an insurance policy, because in the eventuality that the home burned down tonight that would be a catastrophe that the usual person would want to avoid. So we think it prudent to invest in an insurance policy to guard against that, the consequences of that eventuality.

We have now in Russia a politics which may be arguably one of the more popular politicians there who has two goals he has stated. One is to father a child in each province and the other is, after he takes over Russia, to take back Alaska, Zhirinovsky. He has 25,000 nuclear weapons and the capability to deliver them. I don't think that I would put the probability of that kind of an eventuality any less than somewhere between highly unlikely and unlikely.

Now, if you were using the analogy of the insurance policy on your home, it is hard for me to understand why we are not investing nationally in an insurance policy against that eventuality. Can you help me understand our national philosophy on this?

General O'NEILL. Sir, I think the decision was made to emphasize theater defense because we could see the threat. It was on the battlefield all around the world. It was proliferating. It had been used against us. We had already taken casualties from it, so we felt that the first thing we had to do was get missile defenses in the field for our forward deployed forces friends and allies.

The threat to Continental United States [CONUS] appeared to have been handled in terms of the former Soviet Union and China through deterrence, which is the strategy that we have had in the United States since the, I guess the 1960's. And it was felt that that—we could see no reason that that strategy would not prevail, so that what we were concerned about on the national missile defense side was either an accidental launch, an unauthorized launch, or another party in the world other than Russia, one of the former Soviet republics or China having access to weapons of mass destruction and the means to get them to the United States.

That is when we asked the intelligence community what the likelihood of that was, and they suggested it was highly unlikely before, and I think General Clapper said, beyond the time frame 2005, if nations like North Korea continue to develop these kinds of capabilities, the situation could be ominous.

So, of course, I don't generate the threat, but based upon that, my focus has to be a national missile defense in that time frame in terms of deploying something, being prepared to deploy after the year 2005 or whatever.

Mr. BARTLETT. I understand the rationale that says that an urgent requirement is the theater missile defense.

General O'NEILL. Yes, sir.

Mr. BARTLETT. Frequently, the urgent pushes aside the important because you need to wash the dishes and diaper the child and those are urgent things, important things. I will be very brief.

I think there is a Bible text that I think I would quote in this instance and that is this: "You ought to have done the latter and not to have left the other undone."

Thank you very much.

General O'NEILL. Yes, sir.

Mr. HUNTER. I thank the gentleman and let me recognize the ranking member of the full committee, who passed on his first round, Mr. Dellums.

Mr. DELLUMS. Mr. Chairman, I would like to continue to pass. I find these hearings extremely interesting. I would like to see how they further develop in the direction that they take and at the appropriate point I would like to ask some questions and make some comments.

Before I leave, though, I would say to my distinguished colleague from Maryland, the answer to your question is deterrence; that when we are talking about large-scale potential nuclear attacks, as you might from former Soviet Union Russia, as it were, that is what deterrence is all about.

Mr. HUNTER. I thank the gentleman. And the chairman of the full committee wishes now to put his oar in the water.

Mr. Spence.

Mr. SPENCE. Well, I might say that I, too, am interested in listening and trying to learn more from the people, but an interesting question did arise in my mind following the one by Mr. Bartlett and Mr. Dellums.

What if someone did develop this capability with a single or a few missiles and deterrence was not a problem, a rogue nation, Libya, for instance?

General O'NEILL. Yes, sir.

Mr. SPENCE. You said we do not have a defense right now against it. How long would it take for us to deploy a system to defend against it and, in the meantime, are we likely to be blackmailed by this other country?

General O'NEILL. Sir, the program we have right now is what is called a Technology Readiness Program and what we have done is we have tried to provide in that program as soon as is practical deployment options. And as Secretary Perry said, the program as it is laid out today would allow a deployment option in approximately 3 years. And the cost of the kind of defense that I think would satisfy the rogue state with a few missiles would be about $5 billion that it would take to provide that kind of capability.

So we have a program right now that in a total of 6 years from today, so that is just after the turn of the century, could put that kind of capability in place.

Mr. WELDON. Will the gentleman yield?

Mr. SPENCE. Yes, be happy to.

Mr. WELDON. General, further discussion of that point. I assume you are talking about a system that would be perhaps based at

Grand Forks that would give us what they call a thin layer of protection.

General O'NEILL. Yes, sir.

Mr. WELDON. What would be the effective rates of protection that system would give us against a rogue missile launch of, what, 1 to 3—how many missiles can we defend against with that system?

What would be the percentage we could feel comfortable with that we could protect the mainland of America or the whole North American continent, whatever it would be.

General O'NEILL. Yes, sir. It would really depend upon how many missile, defensive missiles you purchased. We can, of course, under the treaty buy up to 100 missiles.

Mr. WELDON. Take that, for instance, that is the $5 billion figure.

General O'NEILL. No, sir, the $5 billion figure was quoted for a 20-missile buy.

Mr. WELDON. Take that. What would that do.

General O'NEILL. That would defend against roughly four of these enemy systems.

Mr. WELDON. So that would be perhaps one SS–25 battery of three missiles.

General O'NEILL. Yes, one battery of SS–25, if he had SS–25.

Mr. WELDON. What would be the effective rate of protection that system would give the Continental United States.

General O'NEILL. I guess I can, in general, at the unclassified level, I would say 90 percent probability of no leakage.

Mr. WELDON. That is fairly significant.

General O'NEILL. That is significant capability, yes, sir.

Mr. WELDON. If we went to 100 missiles, it would simply increase the number proportionately.

General O'NEILL. If we went to 100 missiles, we would not increase the probability of kill very much, but we could, then, if the adversary had 10 missiles, 10 SS–25's, we could defend against 10 SS–25's, but our capability would still be about 90 percent or better.

Mr. WELDON. Would the footprint for that system be the entire Continental United States.

General O'NEILL. Yes, sir, the entire Continental United States.

Mr. WELDON. For $5 billion.

General O'NEILL. Yes, sir.

Mr. SPENCE. I appreciate that. I have to go, but I wanted to make that point and further just to throw in for what it is worth that I don't think those of us who are concerned about national missile defense want to do it at the expense of the theater missile defense. We are concerned that is a top priority, no question about it. But there is no reason we cannot do both at the same time. It is not one or the other and some people try to portray it as one or the other and it is not that kind of ball game. Thank you.

Mr. HUNTER. The gentleman, I am going to yield to the gentleman from Texas, Mr. Thornberry, but on the chairman's statement, let me just ask a quick follow-up because I think it is appropriate.

From listening to General O'Neill and looking at analyzing some of the things you have said, if you had an extra billion dollars in

theater missile defense, you could probably use that fairly effectively, could you not, in that program?

General O'NEILL. In theater missile defense, sir? I don't——

Mr. DELLUMS. He is not going to tell you he would blow the money, I am sure.

Mr. HUNTER. I think we will get to a point here in a second. You have said you could accelerate some tests if you had more money.

General O'NEILL. Yes, sir, we could certainly accelerate some tests. I would like to come back with a better answer, sir, because off the top of my head that number might even be high. I might not need, even at my best I might not be able to wisely—I know these gentlemen would take it, but I don't know whether I could wisely expend that money.

Mr. HUNTER. Well, general, I think you are getting close to the chairman's point. Then, certainly, if you think it might be marginal that you could use all of a billion dollars in theater, it would probably be extremely marginal that you could use all of $2 billion in theater in terms of an annual plus up; is that correct.

General O'NEILL. That is true.

Mr. HUNTER. Would it not then be fair to say that additional moneys that we might want to spend on missile defense beyond that, should we put it in national missile defense, would in no way deprive the importance or the urgency of theater missile defense?

General O'NEILL. Yes, that is true.

Mr. HUNTER. OK. I thank you and the gentleman from Texas, Mr. Thornberry, is recognized.

Mr. THORNBERRY. Thank you, Mr. Chairman. And you are heading right down the road that I wanted to pursue. The thing that occurs to me in your discussion with Chairman Spence is how much are we willing to bet that the Intelligence Committee is correct. I mean the intelligence community is correct. They have not always proven correct, and we are staking a great deal, it seems to me, that they are correct that the intentions of Russia will remain friendly and it will not be a rogue of some sort, either a general or a State come to the fore.

I wanted to follow up on something you were just talking about. You say in your statement, of course, that theater missile defense has top priority. National missile defense has second priority. What does that mean? Does it mean we have got to get to a point where we can deploy theater missile defense before we will begin the process of deployment of national missile defense? Does it mean that we are going to fund the two at about a 70–30 ratio for the foreseeable future?

If there is a breakthrough that could provide significant protection for the American people, are we going to ignore it because it is a second priority?

General O'NEILL. Sir, the philosophy that we embarked on as a result of the Bottom–Up Review, of course, was driven to a large extent by economics and deficit reduction concerns and things like that. So what we did was we had to make some difficult decisions with regard to where we would acquire systems, because that is the biggest investment in our business. And what we would do in the case of other systems and other concepts.

What was decided was that in the area of our second priority, until we saw a change in the threat situation, that is either evidence that one of these undeterable nations had a strategic capability, and that is more than just the missile, that is the missile and a weapon of mass destruction of some kind, until we saw that, the program would be a technology program. And the focus of the program would be to provide on the shelf, as it were, based upon things like proof of principle, laboratory experiments, things like that, the technology that would support national missile defense if and when it was needed.

But there was no intention throughout this program to begin acquisition and there would have to be a reassessment on a timed basis of that philosophy to make sure we did not fall into a trap, as you are suggesting, of doing research forever.

Because of the resources that we saw required to provide the core of systems and potentially a fourth system, either Navy Upper Tier or some other system, that pretty well expended the projected resources up through about the first 5 years of the next century. So significantly more moneys would had to have been authorized and appropriated if we wanted to do something between then and now in terms of something else.

Otherwise, if we were in the same budget area, we would have to back off on a theater missile defense [TMD] system in order to do a national missile defense [NMD] system. And that is where we fell. So we made a decision that we were not going to for a long time deploy national defense, but we protected with our dollars the ability to respond quickly and by quickly we mean like 3 years to respond. If you are not with 3 years——

Mr. THORNBERRY. I think we would all be concerned that intentions can change quicker than in 3 years and I think you have very powerful evidence in your statement when you mention that 25 countries have weapons of mass destruction, within 5 years 20 countries will have ballistic missiles, 77 countries have cruise missiles. The threats seem to me to be there.

I wanted to ask about one other thing during my time and that was a report earlier this week where a former Member of the other body says that we have put restrictions on our own capability and he specifically points out restrictions on the Patriot to prevent it from having a capability against ICBM's—intercontinental ballistic missiles [ICBM's] and blocking Patriots from using data from satellites because of political opposition to using space-based systems.

Are you aware of any secret regulations that are tying our own hands behind our own backs?

General O'NEILL. Sir, with regard to any of the operational systems, I am aware of nothing with regard to restrictions on those systems. In the area of treaty concerns, we have had reviews of experiments and programs to ensure that those programs are treaty compliant. Many times we have heated arguments about what is and what is not treaty compliant, and the legal decision normally is the decision we have to respect.

But in terms of the restrictions on Patriot, and blocking data from satellites for Patriot, I have no knowledge of that. In fact, as you probably all know, during Desert Storm there was an open phone line between Colorado Springs where they were, where they

had the Defense Support Program [DSP] satellite and the people in the Mideast to tell them, hey, there is something coming. And then there were local radars that would actually see the scuds and they would validate the fact that the data was coming.

The reason it wasn't tied into Patriot was that we had not done it yet. We had funded it, but we had not really thought that much about it. And we have learned since, and in the future I am sure we will be more digitized on the battlefield, and that is one of the things the Army and the Navy is doing very well. They are trying to get rather than people calling on a phone and saying hey your house is on fire, actually getting it digitally.

Mr. HUNTER. I thank the gentleman for his excellent question and let me announce that we are going to continue through the vote. Mr. Weldon will be back in a minute and replace me. So let me yield to Mr. Bateman for his question.

Mr. BATEMAN. Thank you, Mr. Chairman.

Mr. HUNTER. And let me say, after Mr. Bateman I have Mr. Geren, Mrs. Harman, Mr. Watts, and Mr. Edwards.

Mr. BATEMAN. On two accounts I want to ask this question, general, for the record. If you would submit something for us on it.

On account of the fact that it is something I am going to want to be able to have to look at from time to time and not just in immediate oral response, and on account of the fact I am going to have to go vote before you can answer the questions.

Mr. BATEMAN. My questions are two. The first is, would you do for us a memorandum that quantifies where the priorities lie and how much money we could intelligently use to augment the ballistic missile defense programs? It is apparent to me from the discussions I have had with my colleagues from our action on H.R. 7, from the questioning of Secretary Perry and others, that I think the majority of this committee at least believes that we need to be more aggressive than the administration budget was last year and this year in this area of national security concern.

We feel that we certainly want to be sure we are going to find money to augment these programs, that it can be well spent within this time frame as opposed to a more modest increment in the fiscal year 1996 budget, looking to a further enhanced increment in the fiscal year 1997 budget.

I would like to be able to deal more confidently with those kinds of questions than I presently can.

The other thing is the extent to which we are in any way constrained in the development and deployment of ballistic missile systems, either theater or national, by the ABM Treaty and whether or not we have opted, because of judgments made with reference to the effect in terms of that treaty, for more expensive, less immediately doable solutions because it was regarded as being noncompliant; and what the present thinking among the people such as yourself charged with developing these systems is as to whether or not we should be very aggressively seeking a clarification or amendment of the ABM Treaty.

I would be very grateful for responses to those questions. With that, thank you and I will go vote.

General O'NEILL. I will provide both for the record, sir.

Mr. HUNTER. I thank the gentleman.

Awaiting Mr. Weldon, I have succeeded in emptying the room.

You have given a pretty good estimate pursuant to several questions with respect to the cost of a ground-based system, the so-called FNTAC defense. Let me ask you a question with respect to using space-based elements.

First, a TMD system that was totally space-based, do you have any estimates with respect to cost, performance and technological risk associated with the space-based option deployed somewhere between the year 2000 and 2004, if possible?

Second, a national missile defense system with integrated ground- and space-based elements deployed in the years 2000, 2004, any thoughts on that? I know those questions are tough to——

General O'NEILL. Yes, sir, but we have thought about these things for many years, and we have data that we can provide you. Off the top of my head——

Mr. HUNTER. Please feel free to provide written answers at length when you get back.

General O'NEILL. I would appreciate that, and then I can use written answers to adjust my verbal answers because they will probably be a bit naive when you read the results. If you talk about a totally space-based architecture for national missile defense, you are talking about space-based interceptors as well as the Brilliant Eyes system.

If you were only doing boost-phase engagement, which you can do with the space-based interceptor, you wouldn't get as good a performance, so I am assuming you want an optimal performance so you would have to buy the sensors that track the cold bodies as well as the sensor and weapon that engage the boosters, because that weapon—if cued by the Brilliant sensor, it can fly out and rendezvous with this reentry vehicle and kill it. That is the Brilliant Pebble.

The architecture that we always talk about for Brilliant Pebbles was approximately a thousand-weapon architecture, and the reason you need that many weapons is to always—one, because they are in space, to have global coverage, you always have to have a relatively large number up in order to have one or two within range of anything launched anywhere on earth. So the numbers that we talked about in fiscal year 1988 dollars was roughly $10 to $11 billion for the Brilliant Pebble architecture.

If you added roughly $5 billion, which would be the cost of the Brilliant architecture, plus the downlinked BMC cubed, you are talking roughly about a $150 million deployment cost for the system, that the R&D for that program is not now in our program, so you would have to add some amount for R&D.

You can't compare, though—the architecture that I talked about that was a ground-based architecture with limited capability doesn't compare to the space-based architecture because, being global, it can do theater missile defense as well as national defense, so it has more robustness.

Mr. HUNTER. Let me ask Mr. Bartlett to take the chair and I will go vote.

General O'NEILL. The cost of the mixed architecture, which would have ground-based elements and space-based elements, you

could look at in two ways. If you were talking just about the sensors in space, the architecture would cost you roughly $5 billion for the limited defense capabilities of the ground-based only, and then you would add the Brilliant Eyes satellite sensor system that would provide you increased capability for over-the-horizon attack and better performance.

You would probably, because you added the Brilliant Eyes, want to add more interceptors, and then what you would arrive at basically with a mixed ground-based weapon and space-based sensor architecture is what we call our objective system, and that is the system that our technology program is focusing on. So you wouldn't have to pay extra in the technology budget in order to have that mixed architecture.

Mr. WELDON [presiding]. What would be the cost?

General O'NEILL. $10 billion if you talk about $5 billion for the Brilliant Eyes, $5 billion for the basic ground-based system—interceptors, say another billion dollars.

Mr. WELDON. What is the cost of deployment of that, time of deployment?

General O'NEILL. It would be after the turn of the century because of the Brilliant Eyes which flies its demo in 1998. You would have to produce and then deploy roughly 20 to 30 satellites, and that would take a couple of years.

Mr. WELDON. Mr. Bartlett, did you want to make a comment?

Mr. BARTLETT. Thank you. I wanted to make a comment in response to what Mr. Dellums said, which is the usual response when you are talking about defense against a massive attack in the future; that is, since you couldn't defend against that, why develop anything?

I am reminded of Henry David Thoreau's observation. He was lamenting the harm that man had done to the ecology. He said, if only man could fly, he would lay waste to the skies. It was totally incomprehensible then that man could fly.

With the advance of technology, I am not sure but what our ability to thwart a massive attack like that is at least as good as the probability of flying, from his perspective. So revisiting that is an appropriate thing to do.

Mr. WELDON. Before I yield to our gentlelady, another leader on missile defense, following on the line of questioning that Chairman Hunter was pursuing before he left, we heard figures during the debate on the floor in the range of $30 billion, $40 billion, $50 billion. Do you know what they are talking about?

General O'NEILL. Yes, sir. Some of those numbers, at least the $30 billion number, I remember from our reports to Congress. But we were talking about apples and oranges. The question that I think you need to ask is, what does it cost to deploy, because the issue was deployment. What we did in the program, when asked in previous years what would it cost to get to a single-site ground-based system, we also included the cost of the R&D. We included the cost of the BMD program as well as the cost of deployment.

There are various ways you can cost the system; often people say life-cycle costs. Life-cycle costs include the cost for either 10 years or 20 years of operation. Those costs can be larger than the acquisition costs, depending upon what the system is.

In the case of our systems, because they are low-density and not sailing all around the world that often, the cost of our systems in operation are generally low. But you have to understand these numbers and what you have costed in the number.

But to answer the question, what does it cost to deploy, I am assuming we have an R&D program and that we continue to have the money to do the research and development, and the question is, what in addition do you need? That is what Dr. Perry meant when he said, it will cost $5 billion to deploy a very capable system against a very limited threat. He didn't mean that General O'Neill could stop this program, do no more research and deploy.

Mr. WELDON. Are there any scenarios that would require for deployment funding in the range of $30, $40 or $50 billion from this point in time forward?

General O'NEILL. Yes.

Mr. WELDON. To defend against attack?

General O'NEILL. No. General Black very correctly handed me a piece of paper that says, for deployment against a massive threat, maybe yes.

Mr. WELDON. Is it true that no one is talking about a massive threat?

General O'NEILL. No, sir. No one is talking about a massive threat. The figures were provided in a different epoch where some of these numbers we were thinking about the potential of a Soviet attack.

Mr. WELDON. You are talking $5 to $10 billion for deploying against the kind of attack we think may be down the road, but in no way are we talking about a dollar even that goes into the $20 billion range for deployment?

General O'NEILL. No, sir.

Mr. WELDON. The gentlelady from California has been one of our leaders on missile defense, and I yield to her at this time.

Ms. HARMON. Thank you, Mr. Chairman.

If you called on me a third time, maybe you would say something even nicer. One might ask how one gets to ask questions if one is junior around here. The answer is you wait for the vote. It is a hint to my friends down there.

General, as you know—I know the panel knows this is a subject of intense interest to me and a subject of intense interest to this committee. We have spent a lot of time already in the first 60 days of this Congress focusing on the issue, and we had a lively debate in committee and on the House floor about it and I tried to make some contribution. Let me just focus on one aspect of it because so much has been covered.

Part of our debate—I suppose a part of the debate that focused on national missile defense focused on ground-based versus space-based, and we had a vote on the floor and we had a lot of conversation.

General, my first question—and let me put all three out because I am terrified that someone will lop off my hands—my first question is assessment of the need for ground-based technology and, perhaps ultimately, deployment versus space-based technology and deployment; how you weigh the two? I am not saying we should

choose one or the other but what is the relative weight you would give each?

The second question is specifically about the role of Brilliant Eyes in this matrix.

And the third question is not focused on MFD but TMD, if someone threw a bunch of money at you, you said you couldn't find a way to spend a billion dollars more on TMD. My question is, are we spending enough on TMD only and are you happy with how we are spending money on some joint programs in the TMD area, such as the Arrow program and other collaborative programs that we have?

The reason I ask that is that it strikes me that one of our allies that is most threatened by missile technology certainly now is Israel, and we saw damage to Israel during Desert Storm. We also saw damage to our own troops. So I am very curious about how that program is going and what priority you give to that.

General O'NEILL. First, the assessment of the need for ground-based technologies, space-based technologies and how to weigh one versus the other. I think I am not satisfied with the state of the technological art for ballistic missile defense in any venue. So we need technologies.

The reason that we haven't been able to do much about ballistic missiles since the V–2 appeared in 1944 is, there are very good reasons that we haven't done a heck of a lot. We were able within weeks to handle the V–1 because it looked like and flew like and behaved like an aircraft. But the V–2 fell out of the sky on your head and there wasn't anything you could do but kiss your wife or your husband goodbye.

So we have been pushing the technological horizons with this program, with the help of the Air Force, the Army and the Navy. I think the challenge the Army has in ground-based technologies for missile defense is, it would be hard to say that it is less challenging than the challenge the Air Force has in space technologies. I think we need all of them.

How to weigh them? Right now, because of our orientation toward the core systems, we are weighing the ground-based technologies more heavily. I cannot lie about it; we are weighing the technologies applicable to Patriot, Navy Lower Tier and THAAD as No. 1, and the technologies for things like Brilliant Eyes as next.

Let me get to your next question, the role of Brilliant Eyes [BE]. I think BE will be the most important element of missile defense both in the national and theater missile defense programs. I think the people who are astounded by what Global Positioning System [GPS] can do for the combat force ain't seen nothing to what a system like Brilliant Eyes will be able to do. It is a heck of a lot closer to earth. It will be able to see a lot of what is going on both before it happens, while it is in test; and then after it happens, when somebody is shooting something at you, you will be able to see exactly what the stuff looks like. So as far as I am concerned, it is probably the most important element, if you really want to have robust missile defense, ever is Brilliant Eyes. I have tried to make that point to everybody who will listen.

Ms. HARMON. I am listening.

General O'NEILL. I think it is a vital program for national defense; I am very supportive of it.

In terms of TMD spending on joint programs, I echo your concern about the pace with which programs with our allies are moving forward, and one that we all worry about is Arrow because I don't want to be there and have them struck again and not able to respond. I think Arrow is moving well.

The issue of enough spending—one of the things you have to understand about Israel is that they want to do it themselves. They don't want us doing it for them, so it is being done in Israel by Israelis. When you go into an Israeli plant, everyone is working as hard as they can work, and there are no extra people around; so even if I had the money, I would find it hard to obtain the services. We don't have Hughes, General Dynamics, and Westinghouse roaming around the desert of the Sinai. They are very small companies, very dedicated, and you get like $50,000 a man-year in Israel whereas it is about $100,000 a man-year in the States. So you get two for one there.

I think they are fully committed, and they are fully supported by their Prime Minister and their defense force. Again, they have put about as much into the program and we have put as much into the program now as I think we need. The deployment phase is vital to the Israelis, and I have tried to stay out of that and suggest that when it gets into deployment, that is Israel's job; and from my standpoint, Israel has to trade off buying the missiles and the missile defense systems versus buying fighter planes, tanks and other things. And that is—some of the money comes from the United States in the form of aid money.

Ms. HARMON. Thank you.

Mr. WELDON. We will be back around for another round.

General, isn't it true that—and I am a big supporter of the program—we have paid about 80 percent of the cost of it to date?

General O'NEILL. You have to be careful about that number.

Mr. WELDON. What would be the correct number?

General O'NEILL. I am going to try to lead to it. I have to explain.

When we got into the Arrow program, we told the Israelis that we didn't see a lot of payoff in your radar system, so you have to pay for that yourself. So they have developed a real crackerjack radar I have seen recently, and it looks state-of-the-art to me. They developed it themselves, 100-percent funding by Israel. They have developed their own battle management, command control and communications that fits into the Israeli air defense system, which is somewhat different than ours.

We decided early on that we would assist them in the building of the missile, the development of the missile. So in the missile area, we started with an 80–20 and are now at a 72–28 percentage. So if you look at the system as a whole, I would suggest that the U.S. investment is probably in the range of 50 percent.

Ms. HARMON. Would you yield?

I think the Israelis are responsible for the launching, too, which is a different launch vehicle than what we have.

General O'NEILL. Yes, ma'am.

Mr. WELDON. I thank the gentlelady for that clarification.

Now I yield time to perhaps the one person on this committee who knows more about defense than any other member, the gentleman from Oklahoma, Mr. Watts.

Mr. WATTS. Thank you, Mr. Chairman. My colleague from California talked about the junior members; you can always tell when the junior members of any committee ask questions. We leave the meeting doing somersaults, so people know we got to ask questions in the meeting.

I was not going to ask a question, but felt I should. The U.S. intelligence community, General, does not agree on the date by which a new missile threat to the continental United States will emerge. Some analysts say a decade or more from today, while others argue perhaps before the turn of the century. All agree, however, that the time line for fielding such a threat could be accelerated dramatically if a long-range missile were purchased instead of indigenously developed.

What is the intelligence community's current assessment of when a new missile threat to the United States is likely to emerge; and two, what new strategic offensive systems are currently under development in Russia and China? Are you concerned about the possibility of an accidental or unauthorized missile launch from these countries, and why or why not?

General O'NEILL. Sir, in open testimony, I am not going to be able to go into a lot of details, and also because I am not an intelligence expert. I am a customer of the intelligence community, and they talk and I listen.

In terms of the comment I made earlier, it regarded a comment made by General Clapper, who is the Director of the Defense Intelligence Agency, in testimony on 10 January. He said that if the North Koreans continue in the mode they are going and the fact that they are developing two systems, Taepo Dong 1 and Taepo Dong 2, by the turn of the century, or within a decade, which I take as 2005, the situation could be ominous.

Those were his words. What does that mean? I think he means they could have a capability with that particular system to strike Alaska, Guam, which, of course, are of great interest to the United States. So that is the kind of time line that I see the intelligence community picking as a time line when they see indigenous development of a threat to the United States.

Now, what you were talking about was purchase or acquisition through theft or other means. They have not given us an—either a likelihood of that or a time; but I think it was Mr. Woolsey, in his confirmation, when he talked about the time line for development of these kinds of threats, he said if the party was able to either buy the system, a component of the system or the technology for the system, then these time lines could be thrown in a cocked hat; in other words, it could be a very short time line. So as far as where purchase fits, I can't give you a better answer than the intelligence community.

In terms of what new strategic system developments are under way, I cannot in this forum give you specifics. But I can say that there are modernization programs going on both in the former Soviet Union and in China and that these are things that we need to monitor and understand, because the more modern the systems

get, the more they might be able to affect our defensive needs or the equation of the deterrence.

Mr. WATTS. Thank you.

Thank you, Mr. Chairman.

Mr. HUNTER [presiding]. I want to thank the gentleman from Oklahoma for his contribution to the committee and Mr. Thornberry as well.

Mr. Edwards of Texas is now recognized.

Mr. EDWARDS. Thank you, Mr. Chairman. I apologize for coming in and out. I hope I don't ask questions that have already been asked and answered.

I think in some ways we are probably not as far apart as we seemed in the floor debate several weeks ago. We want to protect American citizens in the continental United States against threats, particularly from terrorists.

What threat in the next 5 years poses the greatest potential problem for American citizens safety? Could you say, General, is it—let me just arbitrarily pick four threats: delivery of an intercontinental ballistic missiles [ICBM] from a rogue thug or terrorist; second would be delivering the same type of warhead, but in a U–Haul truck or in a small boat in a harbor outside of New York City or Baltimore; biological weapons; or chemical weapons? To the best of your knowledge, is any one of these four threats more immediate than the others? Is there reason to believe, for example, an ICBM launching to the continental United States is more of an immediate threat than delivery of biological or chemical weapons, or delivery of a U–Haul weapon in a U–Haul truck?

General O'NEILL. It seems to me that the weapon of choice in Desert Storm, Saddam Hussein had multiple options. He chose a ballistic missile as his delivery vehicle. I don't know what a thug state is going to do.

My job is not to interdict U–Haul trucks; my job is to provide a military capability where none exists. As a military man, I am embarrassed that we can't combat ICBM's. I don't give anybody, as a soldier, a free ride into my foxhole, and reject out of hand the idea that you are going to have a sacred weapon that you can't ever shoot at. I want to shoot at anything that is coming at me.

As far as the capability, I think we need to have a capability, technically at least, for protection against ballistic missiles.

Mr. EDWARDS. I agree and hope we move forward. But on most procurement programs, we have an R&D committee and we go through R&D and we don't push a program prematurely into procurement. When we have done that, we have found mistakes as a result of that.

If money weren't a limitation, and obviously it is, but if it weren't, would you want to push a land-based missile system protecting the continental United States into the procurement stage now, or do we need several more years of research to then—I guess then be prepared to actually procure the system and deploy it?

General O'NEILL. I think we have to do some research first. I think we could waste some money if we move immediately. I don't think the things that we have put on the shelf yet are acceptable to me. So I would like to—the program that we have put together in about 3 years could give you that kind of an option if the Con-

gress and the President agreed that that is what they wanted to do. We could start deployment thinking at that time.

Mr. EDWARDS. So, at present, appropriation rates for this research, you would say 3 more years of research would be the smart thing to do and then at that point we would be ready to deploy?

General O'NEILL. That is the program we have put together.

Mr. EDWARDS. Once we get there, how long would it take to deploy the system?

General O'NEILL. About 3 to 5 years, depending on resources.

Mr. EDWARDS. Are you talking about a program being deployed 3 years from now, or 3 years from today we would have the research and development in place——

General O'NEILL. Six years.

Mr. EDWARDS. Once we do that, what is the—if you were a terrorist or thug and smart enough to get your hands on a nuclear missile, is it more difficult to deliver that in a truck or in a small boat off the coast of the United States than it is to put it on an ICBM?

If we spend billions—and we may need to, but once we have done that, have we bought a false sense of security? Would a smart thug or rogue dictator take that warhead and rent an U–Haul and deliver it, as we saw with the World Trade Center?

General O'NEILL. I am no expert in what renegade dictators might or might not do, but from some of the comments I have read, there are people like Qadhafi who would love to be able to say—and he can't say it if he is going to use it as a terrorist weapon—I think Mr. Qadhafi would love to be able to say that we have in our inventory weapons that, Mr. President of the United States, you had better be very careful about triggering, if you act against our wishes, to embargo discussions with France, or whatever the case might be. It robs you of flexibility as the Commander in Chief to respond to that dictator and say, if you do that, I will defend. I won't blow away Tripoli, I won't kill all your people with a massive nuclear retaliation, but we have the capability in the United States to defend.

Mr. EDWARDS. Thank you, General.

Thank you, Mr. Chairman.

Mr. HUNTER. I thank the gentleman from Texas.

The ranking member of the full committee, Mr. Dellums, is recognized.

Mr. DELLUMS. I would like to try to make a few observations because during these hearings I kind of wanted to say, time out, because we are talking past each other, we are not using the same vocabulary, we are not using the same definitions; and I would dare say that there may not be three members of the full committee, let alone these joint subcommittees, that know what the present architecture of the present program really is, and that is why the chaos that is very obvious in these hearings.

I want to come back to that, but want to make one point to you or Admiral Hood.

When I raised the question with respect to Navy Upper Tier and the failure of the test, my point was not to highlight the failure of the test. That is what demonstrations are about. Some fail, some pass; that is how we learn.

The point I wanted to make there was that this program is in the demonstration phase and that is where you are able to make these kinds of tests. It seems to me it is not at that point that you want to put a tremendous amount of extra dollars into that program, that it hasn't matured to that point as yet.

Second, you, Chairman Hunter said you drew a comparison between the dollars in the present program and the dollars expended for ballistic missile defense in previous administrations. With all due respect, that is like comparing apples with grapefruits. The program then was a very different program, and trying to compare dollars then and now is an absolute, complete waste, and it is an exercise in futility; it doesn't make sense.

The second point was that $2.9 billion is inadequate. We need to fund it more.

Mr. Weldon, you said we need to put more money in the program; somebody said, what about a billion dollars? Well, if I walked up and said, I would like to have a billion dollars to put in an education program, the first thing you would say is, let's be very specific about where you want to spend the dollars. Where do you want to spend them, why do you want to spend them and to what end?

It would seem to me that when we talk about additional dollars with ballistic missile defense, we must assume the same high degree of responsibility; and that is where, why, to achieve what objectives? I would suggest that there are several objectives that we need to meet before we can start talking about adding dollars.

I listened to questions on threat, on money, on specific programs but nobody has asked a question, what is your present program? What is the architecture of your present program? When I have raised the point with the gentleman from Maryland that an organized attack—nobody talks about the fact that deterrence got us to this point, that with respect to organized attack, deterrence is still a real live thing, we are still a nuclear nation—the response of the Chair from the full committee was, we want a program to deal with those rogue countries exactly because, I think, if we stop long enough to find out what is the architecture of the program, that is what these gentlemen have done.

For the first time, Mr. Chairman, I would suggest to you that we now have what seems to be a program. It is bounded by adherence to the ABM Treaty, a rogue scenario. Here are the factors that have now contributed to the development of a program.

So I would suggest that there are three objectives that we need to try to meet before we get to where we are trying to go: first, understand the administration's planned architecture and the priorities for theater missile and national missile defense programs; second, determine for ourselves whether or not the administration's plans meet the direction of Congress in terms of cost, schedule, performance, ballistic missile treaty compliance; and finally, identify program activities on the critical path to fielding theater missile defense and whether or not these activities are paced by the availability of dollars or time to develop. A number of these issues are driven by the technological realities, not driven by dollars.

So I think we need to step back and start over in these hearings, because I think it is important to have a closed-door meeting, bring

these folks back and say, sit down and let's talk about the present architecture.

Do you know what I think will happen, Mr. Chairman? People will say, my God, they are already there; and maybe that could preclude the need for us going down the present road that we are going.

The final point, just for the purposes of emphasis, we should not be talking about adding dollars until we are able to talk about that with a degree of specificity that makes sense. I heard the General say on more than one occasion, you may be giving me a little too much money. We have even heard from some of the contractors that said, we finally have a program. If you start dumping into this like you did years ago, you will take us back to where we were before, when we didn't have a program, because it had no parameters, and we are going in several different directions. So I think we need to slow this train down and get ourselves knowledgable.

It is unfortunate when only two people know what the present architecture is. We set up these hearings and we start to move to increase the dollars and talk about the threat, when we haven't talked about the fact that these folks have laid out for the first time what now appears to be a program.

Over the years, I have been a critic of putting money into a nonprogram program. Now you suddenly have the parameters of a program, and rather than marching forward, Mr. Chairman, I would submit that we are getting ready to march background by throwing money out without specificity about what it is we want to achieve, what are our objectives, where do we want to go.

Mr. WELDON. Would the gentleman yield? I would say that my recollection is that last year we had no hearings on ballistic missile defense.

I would add, for the record, that partially at my suggestion and that of the chairman of the Procurement Committee, we will have five hearings this year. We are having this hearing, we having a full subcommittee joint hearing on the threat assessment, both public and private, where the public can hear what is. We are having a full hearing on what—has the investment over the past 15 years bought it, where we will be able to bring in and allow the general to tell us what we have purchased.

We will have a full hearing on what retired military officers, who have been in situations, could have used if they would have had missile defense capabilities; and a full committee hearing on the ABM Treaty and the implications relative to security.

In addition, I have asked General O'Neill to make himself available for private sessions where members could ask, as the gentleman has suggested, questions about the issue in a nonthreatening forum where people are posturing back and forth. That is the intent that this gentleman has as chairman of the R&D committee.

In addition, we have had staff working for 2 weeks on an R&D high-tech subcommittee trip that would only look at, in this country, those technologies that are supporting the work of the general so that when members are asked to make decisions in May, they will base it on facts and not a lot of rhetoric, as we heard from both sides of the aisle on the floor of the House several weeks ago.

I want to add this point, since I was referenced in terms of my comments about the expense. What I did in my questioning was, I took the general's testimony from last year, and in that testimony, which I have here, dated May of last year, the general said, the program absorbed a severe budget reduction. Quite frankly, it cut the BMD program to the bone—this is not my statement; this is the general's statement—at a $3.2 billion request.

Subsequently, the administration and the Congress reduced that amount. So I say, is that in fact enough for you to accomplish what I think in a logical way is a system and a program that I can support, not what I want, not what somebody wants, but what General O'Neill wants.

Mr. DELLUMS. I think I raised your ire. That was not my intention. What my intention was, was to say, in organizing the hearing, let's put that particular hearing first, particularly given the fact that we have a tremendous number of brand-new members here who need to be brought up to date. I am saying that until you do that, these kinds of hearings have everybody hanging out, and I don't think that is what we want to accomplish.

I think—if we start down the road, I have confidence that the hearings are going to take their own direction based on that reality.

Mr. HUNTER. I thank the gentleman.

The Chair wants to offer one thing, that we did ask the general to come to us with dollar numbers, with dollar changes and with program changes that he would recommend to accelerate the TMD program. One reason I asked the general if it wasn't true that he probably couldn't use more than a billion dollars, for example, in TMD is—and I tell my friend, is to dispose of what I consider to be a fiction, that these two programs are competing.

At the height of debate on the floor, I think at least one theme that I think was perceived by the full House was that somehow if we had a national missile defense track, we couldn't continue with a robust theater missile defense track. That is why I asked the general, even if you put a billion dollars in theater missile defense, that is probably the maximum it could absorb; and I think the general concurred. Is that not right, you couldn't do more than a billion dollars if you wanted to?

General O'NEILL. You wouldn't need that much.

Mr. HUNTER. When folks on the floor—not members of this committee—were talking about how this was going to rob other programs of $20, $30, $40 billion and would delay a robust theater defense program, that is a fiction, at least with respect to the theater defense program; because we couldn't add more than a billion dollars to the theater defense program, at least from the general's preliminary estimates, to get it up to speed, and therefore other moneys that we spent would not prejudice that program if we spent other moneys on national defense. So there was a reason for that.

Second, we will go forward I think with some order. The problem is every member has the question that he wants to ask, and many times we don't vote like the voters in Duval County; we can't vote alphabetically or ask questions sometimes in a manner——

Mr. DELLUMS. If the General wants to respond to programmatic issues that I raised, feel free.

Mr. HUNTER. Certainly.

General O'NEILL. The issue is the architecture, a full understanding of the architecture. I was going to introduce my architect, Doug Kline, who knows it better than anybody but I have volunteered. Mr. Necessary asked us a question while we were sitting here—we have volunteered to brief you, sir, and any of the members or all of the members on an occasion of your selecting on the architecture. But we know where we are going and what we want to do. I think it is simple. I don't think you need a Ph.D. to understand our architecture.

Mr. HUNTER. The General—one question that the gentleman from California brings to light is, as I recall, the General did say that at one point he had to cut a portion of his work in the Upper Tier Program because you ran out of money and you didn't have the dollars to do what you wanted to do.

General O'NEILL. As a result of the Bottom Up Review, that is correct, and the subsequent cuts beyond the Bottom Up Review, I did cut the program.

Mr. HUNTER. Thank you.

General, I want to recognize the gentleman from California, Mr. Dornan, but—for one question, but before I do that, could you give us, in order, the core elements and Navy Upper Tier IOC under the present program?

General O'NEILL. Yes, sir. What I normally talk to is first unit equipped because it is up to the CINC to decide when he has an initial operational capability. But first unit equipped for PAC III will be 1998; first unit equipped for Navy Lower Tier will be early 2000; the first unit equipped for THAAD will be early 2002. And those are the only projected systems with first unit equip dates.

Mr. HUNTER. Do you have one for Upper Tier?

General O'NEILL. It is not projected, sir. It depends upon when it begins, and we haven't decided when in the sequence it begins. If it began in 1988, it would probably be 2007, 2008.

Mr. HUNTER. And that is a function of money?

General O'NEILL. That is a function of the urgency of the need and the dollars that are in the program.

Mr. HUNTER. Thank you, General.

Mr. Dornan.

Mr. DORNAN. I want to follow up on the Navy Upper Tier, and I will probably ask Admiral Hood because he has the program management for air defense—first, about a historical note on today.

More people died today than any other day of World War II and most were what we referred to as "the enemy" in Tokyo, 83,000 minimum and far surpassed the fire storms in Dresden and Hamburg and the atomic bombs that were to follow later in 1945. We did it with 279 B–29's.

Two or three B–2's could have accomplished the same devastation today without civilian casualties, just hitting with precision-guided munitions military targets. We lost 14 crews of B–29s that were bombing from 5,000 to 9,000 feet, a murderous efficiency rate at that low level, which means that any crews that bailed out came down into an inferno. But it was all done from the air. They had produced victory through air power.

You Army guys know that you can't hold ground with air power, but it was a tremendous whirlwind that the Japanese warlords had sown starting in the mid-1930's.

So I have an interest in our mandate in the Preamble of the Constitution. "We, the people of the United States, in order to form a more perfect union"—we will never do that; we are human beings. In order to establish justice, that is what we are debating on the House floor.

If you turn on Court TV, you will see that justice is a failure in our country. It is what you can buy and how you manipulate the jury selection.

The next one up was domestic tranquility. I don't know of a neighborhood in Paris where senior citizens can't walk. I walked all over Moscow and in the dead of night in Leningrad and never felt unsafe, but in a growing number of American cities, most of the neighborhoods are where you shouldn't walk if you are a senior citizen, let alone a child or teenager.

And now comes "in order to provide for the common defense." I heard you loud and clear that you reject out of hand that people have sacred weapons that can kill you in your foxhole or annihilate one of your cities, and Japan's 83,000 dead, including a lot of innocent women and children that didn't vote for Tojo, that would look like one little part of what could happen with a rogue missile coming in or what Mr. Dellums said, an even greater threat of a false-bottom tramp steamer dumping something in the mud of a harbor and then autodetonating it later.

This is a dangerous world. Men are willing to die, I guess a few women, to avenge people. In the Middle East, patience is on their side. We accidentally shoot down an Airbus, they bide their time and kill a bunch of families a few days before Christmas over Scotland, 270 dead, including 11 on the ground.

Yesterday, probably because we paid $2 million to extradite a terrorist killer a few weeks ago three men coolly—not on automatic, but on single-function AK–47s—pulled the trigger for each shot, murdered two Americans, so that funeral operations are under way today, one other is hanging on by a thread in the hospital, a car filled with people in Karachi.

What are we going to do about defending Israel? Here is why I bring this up.

Years ago one of my conservative mentors Bill Buckley wrote a column, tongue in cheek, that we should make Israel the 51st State. He said, we can save $5 billion a year; and we have to give $4.5, $5 billion to Cairo—now it is down to $3 billion each.

I asked for a footprint. Here you have a great one showing all of our bases under the footprint of No Dong missiles. Can you get me a footprint—maybe I can generate it on my grandson's PC—but a footprint of two Aegis cruisers or destroyers off the coast of Israel and what the footprints would protect in the Middle East; because there is support in this Congress on both sides of the aisle, all ideologies under the sun, to not watch an area that is called "holy" by the world's three largest religions, to not see it wiped out with two well-placed rogue missiles.

At this moment, I would not vote to put green suit people in the Golan Heights, but I would vote in a heartbeat to take Yokosuka,

home port of one of our carriers, and have home port at Haifa, which is the best liberty for Navy guys in the world. If they go down to visit Jerusalem, they don't go looking for houses of prostitution as they did—getting AIDS as they did in Subic. I want to home-port a carrier there. But I would like, as a fallback, to have two Aegis cruisers with Upper Tier defense; and here is my question, Admiral Hood.

Admiral, your personal—and that is the way we speak in code to relieve you of submitting speeches or thoughts to the Office of Management and Budget [OMB]—your personal opinion, what it would take, an amount necessary for us to transfer from some other account to get Navy Upper Tier on track for testing and deployment to both the fleet and all forward U.S. deployed military forces? What would it take to get this on track by the year 2000?

I am thinking Manhattan Project World War II, there was no such thing as throwing too much money at it. You set the need, you set the objective and you send the money necessary to get two ships off the coast of Israel; what would it take?

Admiral HOOD. Given the bounds of your question to have that deployed by 2000—

Mr. DORNAN. January 1, 2000.

Admiral HOOD. Yes, sir.

That would take a significant effort. I believe that we have thought—we have the basis to build upon the Aegis cruisers. General O'Neill already talked to the standard missile. I believe that with a Manhattan-like project effort we could do that; and the money in 1996 to put that on track, as you say, with that as an objective is probably in the neighborhood of $160 million or $170 million.

Mr. DORNAN. And you have what, $30 million down from $60 million?

Admiral HOOD. We have $30 million in the President's budget this year.

Mr. DORNAN. This question I may have to just submit. For each year's delay, if we go for January 1, 2001, how could we trim that $160 million to keep going for this goal?

In other words, I look at this footprint and the one you are going to get me off the littoral of Israel, and I can't believe we don't have this on the fastest track possible. Could you get me the figures, what each year's delay—in other words, if you only had $100 million, if we added back the $30 million and gave you another $140 million, what would be the IOC of a destroyer and an Aegis cruiser, an Aegis destroyer cruiser off the coast of Israel, covering this footprint? It seems to me they could cover to Baghdad and more—just guessing—but give me each year like, say, for 4 years to get Upper Tier.

This is Teddy Roosevelt to me, power projection: Speak softly, carry a big stick and get out there and power project; his detractors called it gunboat diplomacy, but it saves a lot of lives. If your gunboats are serious and it is a credible threat, then these crazies that will stand in the middle of the street with an AK–47 killing two Americans yesterday, they are not going to be setting off some rogue weapon.

Mr. SPRATT. Will the gentleman yield?

Is the gentleman referring—the Arrow is not likely to handle this mission?

Mr. DORNAN. As for the Arrow, it has been lucky in the early tests. Hoping it will come through. But I still think, given the scandals in the Rabin administration, you can have political decisions made there where it gets off track.

There is nothing that I see, as an Air Force guy, better than putting a couple of Navy ships, not orbiting, like B–2's off the coast, that say we have protected this big a footprint, don't any thug governments think you are going to get away with lobbing one into Haifa. They won't in Jerusalem, but they will wipe out Tel Aviv.

Mr. HUNTER. If the gentleman would yield, I think the gentleman asks a great question with respect to a $160, $170 million a year. The Admiral said that would put you back on track for deployment around the turn of the century; is that accurate?

Admiral HOOD. I believe to put us back on track would take in the neighborhood of $160 to $170 million in fiscal year 1996. I have——

Mr. HUNTER. Follow that up, if you could, in general terms with the next several years.

Admiral HOOD. It would be several hundred million dollars a year for—until the year 2000.

Mr. HUNTER. OK.

Admiral HOOD. I would have to submit for the record a detailed program. We have not—as General O'Neill has said, we have not done that, we have not indicated an IOC for the Navy Upper Tier system because it is in the status that we have already discussed; that is the start in 1998.

Mr. DORNAN. If my chairman would give me one follow-up. I intend to drive this idea of a home port in Haifa for a U.S. carrier battle group, and that means we would defend our U.S. carrier battle group. That is an advertisement for some terrorist group to lob one into Haifa to wipe out a U.S. carrier in port and wipe out the Israeli's northern commercial city.

So it would have a very specific defense objective, and need I again say that from an old F–100 base up in the north in Mizusawa and Yokosuka all the way down to Sasebo we are also going to be protecting all of these with two ships off the Wonsan. This is absolutely the best idea this Air Force officer has heard in a long time. And Navy's lead on this program——

Admiral HOOD. Mr. Dornan, I share your enthusiasm for that program, and I think that is exactly the kind of situation that the Navy has brought forward, this idea of a theater-wide protection to do the kinds of things you have just described; and I would be very pleased to submit for the record the progression of programs as you have asked for.

Mr. DORNAN. Submit it to the chairman, Mr. Hunter, and he will share it with me instantly.

Admiral HOOD. Mr. Chairman.

Mr. HUNTER. Let me ask just a follow-up, Admiral. You talk—I take it a little less than a billion dollars for a deployment or initial operating capability or weapon availability, in General O'Neill's language you are talking about a little less than a billion dollars

to bring Upper Tier to that level around the year 2000; is that right?

Admiral HOOD. Yes. I believe the number was right at a billion dollars, maybe $1.1 billion that was taken out, the Bottom-Up Review. That was the program that we are talking about.

Mr. HUNTER. How much was taken out?

Admiral HOOD. About $1 billion that General O'Neill's already discussed——

Mr. HUNTER. A billion dollars?

Admiral HOOD [continuing]. Associated with the budget cut after the Bottom-Up Review. That is the program.

General O'NEILL. Let me add.

Mr. HUNTER. Go ahead, General.

General O'NEILL. When that money was laid into the program, we were not on the schedule that——

Admiral HOOD. That is correct.

General O'NEILL [continuing]. Congressman Dornan was talking about. So in order to make his schedule, we would have to look at that. I would have to work with Tim.

Admiral HOOD. That is why I would say——

Mr. HUNTER. Do you think that is a reasonable schedule looking at this program from where you are right now?

General O'NEILL. No, I think it is very aggressive. It is a little bit too high risk, but you know, a couple of years——

Mr. HUNTER. What time—

General O'NEILL. I think 2002; I would be more comfortable with 2002.

Mr. HUNTER. You think 2002, we could deploy, and it would be a moderate-risk program and still around a billion dollars or so?

General O'NEILL. See, for a fallback——

Mr. HUNTER. Start.

General O'NEILL. Yes, sir.

Admiral HOOD. Yes.

General O'NEILL. For a fallback, we would have THAAD anyway in production in that time frame. And if we had to, we could fire THAAD off the deck of the carrier.

Mr. HUNTER. Do you need, General——

General O'NEILL. So that would be a fallback, sir; if we could not get the Navy Upper Tier working, you would have THAAD sitting there, and it could do the job, it could launch off a carrier an amphib.

Mr. DORNAN. Submarine?

General O'NEILL. No, sir. You are asking too much there.

Mr. HUNTER. Admiral, would Brilliant Eyes help the—is that—would that be an important component or could that be an important component for the Navy for Navy Upper Tier?

Admiral HOOD. Yes, it certainly could be an important component. It is not required and, in fact, the system characteristics that we have submitted to the compliance review group do not include it, as required, but as any of these systems we have talked about, could be enhanced by—capabilities could be enhanced by Brilliant Eyes, a Brilliant Eyes-like sensor.

Mr. HUNTER. OK, thank you.

Admiral, I am going to take off to vote now. My colleague will——

Mr. DORNAN. Mr. Chairman.

Mr. HUNTER. Yes, sir.

Mr. DORNAN. Could I get four words in here?

Mr. HUNTER. Go right ahead. The gentleman is recognized.

Mr. DORNAN. I am looking at my countdown watch, 607 days to November 6, 1996, the election. The cosigner is dead; the cosigner of the ABM Treaty is dead. That whole entity that some of us proudly called the "Evil Empire" is gone. That is why I am looking forward to a day when we operate without any ABM Treaty crippling what we have to do to provide for the common defense and defend that foxhole called the 50 United States. Thank you.

Mr. WELDON [presiding.] I thank my colleague.

General, this gives me a chance to ask some additional questions that I have.

First of all, I would like to get back to an issue, the point raised by Mr. Edwards regarding the Tigert team report and the recommendations made to the Secretary. Perhaps you could take us through that, and I guess this is directly dependent upon the amount of dollars that you use, but the recommendation was you could do a two-plus-two implementation as opposed to, I think what you said earlier, which was a three plus three.

Would you comment on that?

General O'NEILL. Yes, sir. The Secretary asked us to look at how fast we could meaningfully work to deployment of a national defense system that would respond to the concern about the rogue nation. I put together a team led by my deputy, Dr. Bill Evers, who is sitting behind me. He worked with the Army, the OSD, other experts, both from industry and government, on the program; and they came back and said that this two plus two was possible, and they provided estimates of the kinds of costs that would be required over the period of the 2 years leading up to the decision to deploy.

And they also suggested that after that 2-year period, you do not have to deploy if you do not see anything. You could continue to do research on missile defense stuff. You do not have to deploy. But at least you are in a position where you can deploy on very short notice and get a meaningful defense in the field in about 2 years.

What surprised me was some of the things that they contributed, and I cannot in this forum—I would have to do it in closed forum—talk about some of the elements they put into this architecture, as Mr. Dellums mentioned the word "architecture," but that they could do a very meaningful piece of work in a relatively short period of time.

So I mentioned this to the Secretary and the Secretary said we should be prepared to talk to Congress about a number of excursions. We must not assume that Congress just wants us to hurry up and deploy something. We should look at some other excursions. So what we did was, we put together a study that built on Dr. Evers' analysis of what we could do quickly, and we looked at what we could do technologically. In other words, if we wanted to investigate the technologies for national defense, which include things like directed energy, the space-based weapons concept, what would

it cost and what would you do if you had additional resources to investigate those options, more robust defenses like the one Mr. Hunter mentioned, where you would have an all-space architecture. So that was an option.

Another option was to just make more robust this baseline program that we have talked about, which is this 3-year kind of a program, so that you could get to an objective system more quickly.

So what we have now is, we have put together a set of three excursions, one which enhances the baseline, one which we call an emergency response system—that is, the two plus two—and another which enhances our technology program in the area of national defense. And what it was felt would be smartest to do would be to give this information to the Congress and then listen and iterate with the Congress and see where their interests lie, because as you know, we get mixed signals.

We get signals from people who want to do technology, we get signals from people who want to deploy tomorrow, we get signals from people who want us to do more in space, not in space. So I thought it was an excellent approach for us to put together this kind of a set of excursions, and I would like to bring that to you, sir. I am now authorized to do it.

Mr. WELDON. I would definitely want to have that. And what I will do is ask the staff to arrange a briefing for members without the formality of a hearing where you can brief all the members from both sides of the aisle on that Tigert Team report.

Let us talk about the two plus two for a moment if we might. Let's say there was a decision made to move in that direction this year; and we will pick a date, say, in the fourth quarter of this year would be the starting point. Are you still talking about the $5 billion figure to deploy? That would include the 2 years to complete the necessary preparations, at which time you could make a decision to deploy and then 2 years to actually deploy the system?

General O'NEILL. Yes, sir. What I would prefer to talk about is—it gives me more flex—I would like to talk about what it would cost in addition to our present program to reach the 2, the first 2-year development.

Mr. WELDON. Fine.

General O'NEILL. That is about a half billion dollars up to about $800 million over that period.

Mr. WELDON. Over 2 years.

General O'NEILL. Over the 2-year period. Total of $500 to $800 million. So that is roughly $400 million per year for the 2 years beyond that, if one decided to deploy at the end of that 2-year period, it would cost $5 billion to deploy.

Mr. WELDON. So the total cost then would be around $6 billion from the date we gave you the word until deployment of that thin layer of protection which you described earlier?

General O'NEILL. Yes, sir.

Mr. WELDON. Four-year timeframe.

General O'NEILL. Four-year timeframe, yes, sir.

Mr. WELDON. I appreciate that explanation.

I want to shift gears for a moment, and I know this program is not in your area, but you certainly have the capability to discuss this, the status of the SA–10 and SA–12 systems of the Russians

and whether or not they are marketing these systems, to your knowledge, around the world and compare them to what we have in terms of our systems.

Some of our colleagues are under the impression the Patriot is the best system available today. Would you comment on that, as well, in light of these systems?

General O'NEILL. Yes, sir. Well, I think it is clear that these systems, the SA–10 and 12, are being marketed.

Mr. WELDON. Could you explain their capabilities?

General O'NEILL. Well, the SA–10 is a system that is generally targeted against high-flying targets at long range. It is a high-velocity interceptor. It is faster than the interceptors that we have. I will not go into warheads.

The SA–12 is a more modernized version of the SA–10. It has two missiles. It has several radars. It is a system that is claimed to have significant capabilities and growth potential in tactical ballistic missile defense.

Mr. WELDON. Would you compare it to our Patriot?

General O'NEILL. I would compare it to Patriot. In terms of how it compares to Patriot, I would personally take Patriot, not so much because of Patriot's velocity or warhead or anything else, but the Patriot is battle tested and the Patriot is easy to operate.

When I look at the sophistication of the SA–12, you have to have a very highly qualified group of soldiers to operate the SA–12 because of the sophistication of its hardware. Patriot is much less labor intensive. So I would pick the Patriot.

Mr. WELDON. But are they comparable in terms of their capabilities?

General O'NEILL. They are comparable. I would like General Black, who is also an expert in this area, to comment.

Mr. WELDON. General.

General BLACK. The SA–12 is roughly equivalent to the capabilities of the Patriot in terms of rough footprint defended and the current Patriot. I will not try to compare it to the PAC–3 capability of Patriot because the PAC–3 is designed specifically to go against tactical ballistic missiles. The PAC–2, and earlier also, has the capabilities to do the long-range aircraft defense, but from a TBM defense perspective, the PAC–3 capability will outrange the SA–12. As far as the ability and the capability of it to defend against tactical ballistic missiles, the Patriot system will be better. But I would certainly put them in the same category of system and comparability.

I think General O'Neill's comments about the ease with which they can be operated, maintained, clearly the Patriot system is a much more capable system in that area.

General O'NEILL. Let me add one thing, if I may, sir.

One of the concerns is that Russia may decide to pay some of their bills with some of their customers with equipment like these, because it is easier for them to come up sometimes with some of their weapons than it is to come up with rubles converted to dollars. So that may be a problem for us in the future.

General BLACK. If I could add, we are seeing that kind of competition around the world right now in numerous air shows and in discussions with countries that we are currently in negotiations

with to sell Patriot to. We have heard comments that they are being offered, basically free of charge, to pay off a debt, SA–12 and SA–10-type systems.

Mr. WELDON. Wasn't it true, General, that a month or so ago the New York Times carried an editorial that was critical of our intelligence community for purchasing the SA–12 and having it delivered at the Huntsville airport, indicating to me that if our intelligence community can buy the SA–12 on the open market, it is being, as you say, delivered all over the world and the New York Times obviously has all the details of that sale because they editorialized on it.

I am sure you saw the editorial.

General O'NEILL. Yes, sir.

Mr. WELDON. I have more questions, but I want to turn to my friend and colleague, Mr. Thornberry, who has additional questions.

Mr. THORNBERRY. We mentioned it several times today, but I wanted to get directly at cruise missiles. And along the lines that you were just talking about, I have seen open advertisements of countries trying to sell cruise missiles; and of course, of the 77 countries that have them, some are making some important gains in performance.

Will PAC–3 give us an adequate defense against cruise missiles or do we need something more? Where are we in our capability to defend against that threat?

General O'NEILL. Sir, I would like to ask General Black again. He is an expert on PAC–3.

General BLACK. The PAC–3 missile, as I just said earlier in response to a question, was designed specifically to go against tactical ballistic missiles. It has an inherent capability to go against cruise missiles, but it is not all we want, because we know that as the cruise missiles are being proliferated and developed, it does not have all the capability that we would like it to have.

So my major area of concern right now in the development of the PAC–3 missile is how it is going to be able to perform against cruise missiles, and we are putting a great deal of effort into that.

Beyond that, let me go back and say with regard to PAC–3, the positioning—as General O'Neill said in his opening statement, PAC–3 was designed 70 years ago—or Patriot was designed in the 1970's, excuse me.

General O'NEILL. I am not that old.

General BLACK. To be placed in Western Europe and faced east and not to be moved around on the battlefield. So as we now look at force projection out of the United States, we need the capability to force-project something that is lighter and smaller but also is more mobile when it gets on the battlefield, to protect the maneuver force, because we expect that, as we saw in Desert Storm, the fighting force is going to rapidly outpace the air defense capability that we have. That is where we feel that most cruise missiles and short-range ballistic missiles will take to attack our forces.

The Patriot system will not be in a position, even with the PAC–3 system, to be able to defend those forces that are out there with the maneuver force. So we think we need to go beyond the PAC–3 missile. It may be capable. We are going to try to make that sys-

tem do the cruise missile job, but because of where the cruise missiles attack, we need the capability out there with the maneuver force. So we want to try to use the PAC–3 missile in those areas where Patriot will be deployed, and then we want to be able to have the next-generation system be able to protect the maneuver force.

Mr. THORNBERRY. Do we know what the next generation is going to be, and will we get it in a time line that will meet the new improvement capabilities of some of these cruise missiles?

General BLACK. The time line of the Navy Upper Tier system, if we put resources against it, we can have the capability and have it in the timeframe, same timeframe we talked about in the Navy Upper Tier.

Mr. THORNBERRY. But a separate system, not part of the Navy Upper Tier?

General BLACK. Yes, we are.

Mr. THORNBERRY. And we have not talked about the Spratt system before today, have we?

General BLACK. Well, it was mentioned in General O'Neill's opening statement. We used to call it this Force M system, the U.S. system, and it is now being proposed as an international medium extended air defense system.

Mr. THORNBERRY. OK. Thank you, Mr. Chairman.

Mr. HUNTER. Does the gentleman from California have any more questions he would like to ask?

Mr. DELLUMS. No, thank you, Mr. Chairman.

Mr. HUNTER. I will ask the gentleman from Pennsylvania to follow up with his questions.

Mr. WELDON. Thank you, Mr. Chairman.

Following up on our colleague from Texas, and it is a good line of questioning, that is the whole issue of cruise missiles. We have been told on the record, public information, as I said earlier, General, that 77 countries now have cruise missile capability and over 20 countries have the capability to build cruise missiles; and while we oftentimes hear the threat that no nation can reach the mainland U.S., I think it is safe to say while the cruise missiles are intended for attacking ships, certainly they can be put on a platform at sea and could in fact be made available to hit our mainland. So I am concerned about that, as well, and what we are doing in the cruise missile area.

I want to ask Admiral Hood to follow up on what General Black said about what the Navy is doing to make sure it maintains capability in terms of sea-skimming cruise missiles, and at the same time, that you are assuming the mission of the Navy area of lower tier tactical to police missile defense—what factors are in your plans and what are you up to?

Admiral HOOD. As you are aware, the Navy has had a long history of countering antiship cruise missiles and there are several ongoing programs which are not the subject of the hearing today. In particular, though, with the Navy area defense program, or our lower tier, our strategy is somewhat different from what General Black described for PAC–3. We have an inherent cruise missile capability in our block 4 missile. What we have chosen to do is evolve that to include a capability or evolve to a capability to counter the-

ater ballistic missiles. And, again, it is not all we want, so our strategy includes a continuing evolution in the theater ballistic missile capability. In other words, we are coming at the problem from the other direction.

Additionally, we have a program that was developed for countering cruise missiles, antiship cruise missiles in the battle group called "cooperative engagement capability," which as we examine that and have experimented with it last summer, we are very confident it can bring some additional capability to this area, theater missile defense or ballistic missile defense in particular.

So we have, we are trying to focus all of our 40 years experience in antiship cruise missiles, trying to bring all that experience and expertise in antiship cruise missiles to this problem of ballistic missile defense.

Mr. WELDON. General, who is in charge here on cruise missiles? Is it the Navy? Is it Advance Research Project Agency [ARPA]? Who is the lead?

General O'NEILL. The cruise missile defense program is coordinated at the Office of the Secretary of Defense and all of us are players in this. I wanted General Hawley of the Air Force to be able to comment, but let me just say that I am a major stakeholder in cruise missile defense because right now my Patriot and my Aegis systems—which of course are theirs, too—but those systems are my responsibility to modernize. I have the money, and it is my mission to modernize them and I cannot come back to my bosses and say, well, it can do ballistic missile defense real well, boss, but I have ignored cruise missile defense. I would get thrown right out the window, and these guys would help in doing that.

So I have become very concerned about cruise missile defense, and I am trying to coordinate with these gentlemen to make sure we go the right way.

One of the things that has not come up here is the whole idea of elevated sensors, and the biggest—I think all of us would acknowledge the fact that the biggest concern in the area of cruise missile defense, to most of us, is finding the thing, because it is down low, and it is flying on the top of the trees or the top of the water. And we need to hear from the Air Force on this, because the Air Force is the preeminent sensor, looking down, coordinating and sending key information to the ship and to the land branch.

So I want John to comment briefing if he would.

Mr. WELDON. Before he does, would it make sense to have that authority for this program directly under your command?

General O'NEILL. We are looking at that right now in the Defense Department. And, as a matter of fact, the Defense Science Board said that there needs to be a place where there is an architecture maintained, a coordination focal point, and we are looking at that right now.

Mr. WELDON. General.

General HAWLEY. Thank you very much. I guess I would offer that, No. 1, cruise missiles look a lot like little airplanes. So as you might imagine the Air Force has a very aggressive program both with improving its sensors, its elevated sensors as General O'Neill discussed, and also improving our lethal means, if you will, against the cruise missile threat.

That is the short answer. But the RSEP program, for instance on airborne warning and control system [AWACS], is very important to that—improvements to radars really on all our aircraft, our fighters, improvements to our area missiles, to be able to engage smaller targets, if you will, all those are essential to cruise missiles. And I think the Air Force, outside of the programs funded by BMDO, has very robust programming also in science and technology, to continue to work in the tech base in that area.

Mr. HUNTER. Could I—would the gentleman yield?

Mr. WELDON. I would be happy to yield.

Mr. HUNTER. Thank you, Curt.

You mentioned, General O'Neill, this elevated sensor problem issue?

General O'NEILL. Yes, sir.

Mr. HUNTER. And yielded to your colleague, General Hawley to answer that. I presume we are talking about this—included in this array of threats is the sea-skimming, really fast-moving cruise missile that is a threat to ships.

I just wondered—obviously, Admiral Hood has to, or the Navy is going to have to have their own indigenous capability to handle these missiles; and maybe, Admiral Hood, you could comment on that briefly. Especially, you said you do not have everything you need with respect to missiles and that left me in a quandary as to whether cruise missiles—whether you are talking about an inability to handle fast missiles or a particular species of cruise missile.

Admiral HOOD. As I said, there are several Navy programs dealing with antiship cruise missiles that are not the subject of the discussion today, the Rolling Airframe missile, the Evolve Sea Spare missile, earlier version of standard missile. Standard missile block 4, upon which we will build this theater ballistic missile defense capability is also—in fact, was originally developed against cruise missiles, to defend against cruise missiles. So we are building our ballistic missile defense capability upon a foundation of cruise missile capability.

As the threat gets lower, gets smaller, gets faster, more countermeasures, maneuvers and so on, it is important to expand the battle space by extending the range at which we can detect such targets, so that we can engage them further away from the individual ships or the battle group in that sense. In fact, that is what cooperative engagement, which I mentioned earlier, was really focused on.

An elevated sensor, in a battle group sense, out in the ocean, that elevated sensor is the E–2 airplane, an airborne early warning airplane that has been a part of the Navy battle groups for years and years. We are in some debate in the Department of Defense now as to what more do we need in terms of elevated sensors, and we are really referring to sensors on aircraft or something that is up in the air.

And, yes, we would like to—we would always like to expand the battle space by expanding the range at which we can detect cruise missiles as they get smaller, as they get lower in altitude and they get faster. That is a problem that has continued since—literally since the kamakazis of World War II.

Mr. WELDON. I thank you, Mr. Chairman. I would like to at this point in time, if it is appropriate, insert in the record portions of comments made by the Director of Central Intelligence, Jim Woolsey, to the Senate Select Committee on Intelligence in January of this year relative to his assessments of Iraq's current efforts: "Such findings support our own evidence that Iraq is still hiding Scud missiles and has a chemical munitions development program, and its program has developed biological weapons."

And also, in terms of Iran, his comment, "Iran is also still seeking long-range missiles from North Korea, capable of reaching Israel," which is possibly a thousand kilometers.

And I would ask the general if you could provide us with an informal briefing on the whole issue of cruise missiles so that you can bring members up to speed on that issue and, once again, that would be bipartisan and not a formal hearing such as this.

My final line of questioning has to do with proliferation, which has been an item of great concern by many members of this committee, especially our colleague on the other side who has led this effort. I had a great deal of concern when I read in the media that Russia, first of all, sold rocket motors to China which, as I understand it, are being specifically used for cruise missiles, and then that we last year sold rocket motors, I believe it was to a company called Garrett, I believe, which are not necessarily for cruise missiles but which the intelligence community feels could be used for cruise missiles. And my understanding is that China now intends on not just having the actual motors but they are now in a position to take the technology to begin producing them.

There has been, from what I can read from the media, a great deal of concern that has been expressed by officials in the Pentagon and the intelligence community, without being named, that this would be a grave mistake. I am not asking you to comment on the policy implications, except what does this pose to us if the Chinese get the additional capability of perhaps the best rocket motors that we have in terms of improving their cruise missile capability?

General O'NEILL. Well, sir, the Chinese already have a formidable arsenal of weapons that concern us if they were either used against us by the Chinese or sold to someone else. So I am already up to my ears in the potential on the CSS–2 being obtained by someone other than an ally, or they have a more modern system that has been mentioned in the media that is a solid propelled system.

The CSS–2 is a liquid propelled system, much more difficult to operate with, but they have a system that they have not sold, I don't know of it having been sold to anybody, but the Chinese have a system very much like our Pershing system, which, as you know, was a very effective system. And the concern I have is that if that were ever sold, it would be very hard to ever find and would be very easy to maintain and very useful in a scenario involving the Mideast or Northeast Asia.

So this particular information, although it is of interest, I don't think it would change the present military posture of China, which is already very stable and formidable.

Mr. WELDON. So you do not necessarily, then, I guess, accept the quote that was in this article dated February 13, "The administra-

tion's counterproliferation program is a total failure. One official said there is not one program that has been able to stop the proliferation of weapons technology in regard to this specific sale."

And the Russians, by the way, have also made these engines available to China. But in your opinion, it is not raising the threat any more than what it already is in terms of the Chinese; is that what you are saying?

General O'NEILL. Sir, General Black just slipped me a note and I think it would be more appropriate for him to comment.

General BLACK. Garrett is not, they may manufacturer rocket motors, but what Garrett is known for is manufacture of gas turbines. Gas turbine engines are not classically called rocket motors.

Mr. WELDON. That is what the article states, but it makes the point they in fact could help the Chinese develop the capability.

General BLACK. Without question, sir, the gas turbines that Garrett builds are prime engines for cruise missiles.

General O'NEILL. And that would change the equation, because what—and I didn't understand the question. But what it says is, they now have a different kind of a weapon, a potential low flyer cruise missile as well as the ballistic missiles, which are the things that I had been thinking you were asking about.

Mr. WELDON. That was the point raised here.

General O'NEILL. Good point.

Mr. WELDON. I thank you and thank all of you. And, Mr. Chairman, I thank the members for sitting through the entire hearing, and I am looking forward to continuing the dialog on missiles. Because I think in terms of our priorities this maybe is an area we have to place a lot of focus. Regardless of where we come down on the issue, the threat of missiles is real; it is state of the art, it is cutting edge, and proliferation is just out of control right now. Thank you.

Mr. HUNTER. The gentleman from Hawaii, Mr. Abercrombie, is recognized.

Mr. ABERCROMBIE. Thank you very much.

Gentlemen, aloha. Thank you for entertaining my question. You may recall during this lengthy—I am not going to say "ordeal," but maybe putting up with us; let me phrase it this way. One of the great dangers I have learned in politics is that you think everybody knows what you know or if they don't, they should. And that which is obvious to you is not necessarily obvious to others, although you think that it should be.

The reason I mention all that is that both Mr. Weldon and Mr. Dellums made very, very clear, certainly to me and probably to other members, how little we know, because they have concentrated their efforts as good-serving members of this committee on this issue and tried to understand it.

I say all of that by way of preface to my question, because I want to tell you I am one of those people. When Ron said at one point, maybe there are three people that understand everything that is associated with the questions that are involved here, I am not fourth or fifth, I am further down the list than that, but it is not because that is either my inclination or my proclivity to want to be that way. I may be ignorant on some of the details, or many of the details, but I am not a stupid person. I can be educated and

that is why these hearings and why your testimony, by the way, is very, very important.

General O'NEILL. Yes, sir.

Mr. ABERCROMBIE. Of necessity I and other members of this committee, who may not be as fully conversant as we want to be, end up making decisions; and we want to be responsible about it. Again, that is a long preamble, but I think it is important for you to understand the reason for my question.

One of the things that has been most fascinating to me in my tenure on this committee has been the briefings that we have had, although they have been few and far between, on the integration of the armed services; that is to say that the classic or maybe the historical divisions that have evolved in the armed services, including at one point the separation of the Air Force from the Army are going through another phase now in which not only are there joint activities and an attempt at joint procurement, joint efforts to standardize equipment, et cetera, and even to the point of saying, are we going to have a continuous service?

It is always interesting to me when you have futuristic scenarios on film, or so on, they do not have an Army and an Air Force and a Navy. It is always the Klingons, or whatever it is, and they all have an integrated force. We have not achieved that.

Now, as I read through—and I have all of the testimony here—you see there is something for the Navy, and there is an Army and there is a rationale for all of it, but what I want to know in the end is, with the ballistic missile defense organization, is that a harbinger of what is going to come in terms of a possible standardization of theater missile defense and, by extension, what theater miss—what the phrase "theater missiles" is going to mean in terms of the practical consequences for each of the services as they now exist or could exist, or will exist, rather, in the future in terms of integrated operations.

And, in addition, and perhaps even more importantly in terms of what this committee votes or does not vote by way of authorization, what are the implications for that kind of standardization if it is going to take place and joint mission for the industrial base that will build and/or maintain or support the outcome and decisions that are made as a result?

General O'NEILL. OK, sir, I can attempt that and I would like my comrades, if I fail—it is an excellent question; I just hope I got it all down. If I fail to cover one aspect over another, please jump in.

First, let me say that the challenge of theater missile defense is too difficult a challenge for a single service, I think, to handle. One of the things I have found, when I moved into the joint venue was that, first, it highlights the weaknesses that you bring yourself from your own service. And it also shows the complementarity that exists between the naval service, the ground service, the air service, the Marine Corps. When you put the four of them together, there is not anything that you cannot do with the support of American industry, science, and others.

What you find in theater missile defense is, because things are happening so fast over such vast distances, you are talking about 1,000 kilometers. So in that 1,000 kilometers you do not just have

army troops or naval troops or Air Force people, you have all three, and marines, and they are all intermixed and they all have to cooperate together because things are happening so fast and the potential for disaster is so great if that weapon gets through it could wreak havoc on any of the four services. So it forces you into a joint arena.

And what we talk about, which is very much unheard of, if you get into the single service venue, but we talk about a scenario where an Air Force sensor will provide information to an Aegis ship that will be controlling the fires of an Army Patriot in defense of an area. And if somebody says, well, wait a second, why can't the Army do it itself? You say, they do not have eyes that are as good as the Air Force's eyes. And they do not have the fire control stuff yet in theater. There are only 200 Army people and one Patriot unit in theater yet. The Aegis ship is laying off the coast with 350 well-trained sailors doing the joint force air component command for that amphibious force.

The Marines are with the Army. So the Army is defending a Marine enclave, a forward enclave, through the control of a naval vessel under the cueing of the Air Force, either space cueing or air cueing. This forces you into this kind of definition of a system. That is why many of the systems I talk about are not green or dark blue or light blue, they are purple. You actually use an Air Force sensor to cue a Patriot, and people say, well, you do not do that, the Army does not believe in that stuff. Well, they will. They have to, in order to accomplish their mission.

Mr. ABERCROMBIE. That is what I am trying to get at. It is not clear to me from the testimony how the logistics of command are going to be worked out in this, and by extension, how the orders are going to be given on the civilian side to put it all together.

General O'NEILL. Yes, sir; The Joint Chiefs are working the issue of, and this gets in——

Mr. ABERCROMBIE. I am not being redundant, I hope.

General O'NEILL. No, sir; I don't think that question has been asked of me today. The Joint Chiefs must work this issue. What you are talking about is ultimately a war fighter's decision as to how they are going to organize to fight. We are all acquisition people.

Mr. ABERCROMBIE. Excuse me, General. I agree that will come out and that is a military decision. But I am interested in how you are going to organize to build them and what the command—how the command structure is going to be to put this together in the first place, not the use of them once you are called upon to do it. That is still not clear to me. It is not clear to me through the ballistic missile defense organization, at least as I read it.

General O'NEILL. I can describe it because that is my job, that is my principal job. There are really three elements to what you are concerned about. First is early warning. What I do is I define the requirements from an acquisition standpoint for hardware to satisfy the users' requirement for information. So I work primarily in that venue with the Air Force.

The next thing is the communications, that is, knowing that something is coming is meaningless unless you can get that information to the people who are providing defense. So what we do is

we try to fit the available communications infrastructure in the time lines that we have to have with the hardware that exists and the procedures that exist.

One of the things we are doing is, we are developing for all the forces, air, sea, and land, a ballistic missile defense cueing architecture in terms of what data would you have to provide, how fast would you have to provide it, and where you would have to provide it. And then we will try to figure out the netting in terms of communication satellites, UHF, VHF, whatever the case might be, to make that possible.

The final element is the command and control mechanism, and the way I fit into that command and control mechanism system, I help the user; when he figures out how he wants to do his command and control, I provide the hardware, the displays, the cathode ray tubes, video screens and computers and processors that he uses. But in terms of what CINCPAC does with his Army component, in terms of whether he lets the Army component go off and operate independently or whether he wants to do it, that is his decision in the war fighting.

Mr. ABERCROMBIE. I am sure my time is at an end. I appreciate all of that, and I followed all of it, but I just want to indicate that I am still not clear enough in my own mind and perhaps I am asking too much. It is easy for me to ask the question. What I would like to see, as someone who is not as well versed at this stage as he would like to be, as Mr. Hunter and some of the others on the committee are, Mr. Weldon and Mr. Dellums.

Mr. HUNTER. Let me assure my friend from Hawaii, we are going to be—understanding that you do have to get in depth in these areas and that is difficult in hearings, we are going to be having a number of briefings, informal briefings, and the gentleman and all members of the committee will be invited to them. And we will have four hearings, also full hearings, but we will also have a number of briefings; and we will try to make sure that—I know General O'Neill has been very cooperative with respect to this—any questions that the gentlemen, like Mr. Abercrombie, have, General O'Neill will see to it that he has one of his representatives or himself or the expert in that given area will sit down and give a full briefing to members.

So we are going to do some of them informally, we will do a series, a full series of formal hearings also.

General O'NEILL. I would be happy to do that, sir.

Mr. ABERCROMBIE. Fine. The bottom line for me in summary is, I would like to have a seamless—in other words, a series of steps as to how all this is accomplished. I realize there is a game plan, whether it is going to be done or not; you know, I watch Vince Lombardi—you get the seam here and you get the seam here and you run up the middle. There is not much to it, is there? All you have to do is make the blocks and run and then you score. I understand that part all right.

But I really want that game plan, and then we will see what happens out of this.

General O'NEILL. Dick was a guard at West Point in 1967 so he will teach us all about seams and defenses.

Mr. ABERCROMBIE. I spent my life with my face in the dirt, so I could stand there and watch people cheer people like Ron Dellums.

Mr. HUNTER. Thank you for that great comment from the pulling guard here.

Gentlemen, thank you for being with us today. Let me ask just a couple of followup, kind of wrapup questions, if you will. And I appreciate your taking the variety of members' questions. Everybody has a question in a different area and also giving, in a number of these questions, some pretty in-depth answers. But let us go back.

You talked about Navy Upper Tier specifically and you said, Admiral Hood, that you could come up with a sensible IOC, if you will, initial operating capability, of around 2002—maybe General O'Neill participated in that answer—for about $1 billion from here on out, counting the fiscal year 1996 moneys; is that accurate?

General O'NEILL. Sir, I wanted to revisit that number, because if you remember the number that Tim mentioned, which was the—it was less than $1 million but around $1 million was the number that we had projected for naval Upper Tier at the Bottom-Up Review time. That was not a deploy in 2002 focus, that was a deploy in 2006–07 focus. So we would very much want to revisit the cost also.

Mr. HUNTER. So it would be something in excess of one?

General O'NEILL. Yes, sir.

Mr. HUNTER. Would you say in terms—I want to get some general parameters, though—and we can sharpen it, and you are not held to your answers. But that would be somewhere between $1 billion and $1½ billion?

General O'NEILL. No, sir, probably be more. I would guess more.

Admiral HOOD. Little more than $1 billion.

Mr. HUNTER. You think a little more than $1½ billion?

General O'NEILL. I would say $2 billion.

Admiral HOOD. One and a half or two.

Mr. HUNTER. Let me go to THAAD. THAAD is projected, or planned IOC now for THAAD is what?

General O'NEILL. 2002.

Mr. HUNTER. It is 2002—and, General Black, jump right in here. Could a sensible acceleration of that program be brought about with more moneys?

General BLACK. Yes, sir.

Mr. HUNTER. Where would you—how much more and what type of a date could we get?

General BLACK. I don't think we could bring it in less than about 1 year to 18 months. As I said earlier, we are on about as fast a schedule as we could go. But 1 year to 18 months, it could possibly be ready.

Mr. HUNTER. It is projected at 2002. It will be bad news for anybody that comes after us at 2002. We will have a lot of systems ready to go at that point.

So you could save about 1 year to 18 months. And what kind of dollars—in fact, why don't you give the total program dollars? We are spending what this year on that system?

General O'NEILL. This year it is about 700, I think.

Mr. HUNTER. From here on out, what is that total program?

General BLACK. The total procurement cost is $8.5 billion for the THAAD missile launcher and the ground-based radar that goes along with it and the BMCQ, including the procurement costs.

Mr. HUNTER. What, in terms of additional dollars in a window of dollars, do you think it would take to bring to accelerate that program to a year to 18 months?

General BLACK. I would like to get back with an answer, but I would say $300 to $500 million.

Mr. HUNTER. $300 to $500 million, OK.

Now, let me ask you, the PAC–3, what is our planned IOC?

General BLACK. Fourth quarter of the fiscal year 1998.

Mr. HUNTER. How much are we spending for that?

General BLACK. $5.6 billion, sir.

Mr. HUNTER. Could that program be sensibly accelerated?

General O'NEILL. I don't think so.

General BLACK. Not really, sir. As General O'Neill talked earlier, the core programs are very robustly funded. So to try to accelerate them is—it is, you can squeeze a little more out of them, but they are getting just about what they need at this point. We have had a few cuts, as he mentioned; and those things could be replenished, as I said. For about $60 million, we could bring THAAD back up to where it was from last year. If we tried to accelerate it 1 year to 18 months, as I said $300 to $500 million over, I am told the first unit equipped for Patriot we are going as fast as we can go with the funding.

Mr. HUNTER. So it looks like the place where you could make most of your gains here with extra dollars would be Navy Upper Tier?

General O'NEILL. Yes.

Mr. HUNTER. Arrow program—and I apologize, I was out when you talked about Arrow; and my colleague Mr. Weldon is with me. He joined me in writing a letter to the Israeli Defense Minister in 1987 with a couple of other people on the committee saying, stop making Levine fighters and start making missile defense systems. So we are very interested in the Arrow Program generally.

Do you have any comments on it, first? Do you think it is going fairly well?

General O'NEILL. I think it is going fairly well and it is going at the pace, I think, that the Israelis can maintain progress. As I mentioned to Ms. Harman, they do not have the large infrastructure of industry that we have, so it would be dangerous to provide too many resources. Because I don't think they can spend them well and I don't think they would ask for them.

I think they are bringing the program along as rapidly as possible. I think, to be fair to the Israelis, they have to face the issue of coming up with the resources to deploy Arrow, and the question is——

Mr. HUNTER. What is that going to cost, General, in ballpark figures?

General O'NEILL. As you know, sir, we did a report or, yes, we did a report for Congress; it is secret. The Israelis for national security reasons classified the costs of that program. So I would hesitate to breach that number right now.

Mr. HUNTER. OK. But you think that program—now, we, the program manager of that program is?

General O'NEILL. In Huntsville. Michael Holtcamp is his name. He works for Dick.

Mr. HUNTER. We would like to get a chance to talk with him; I know the members would like to talk with him informally. We might need to discuss this with him.

Now, let me ask you this question. In terms of the capability, and I think this is kind of a threshold question we should have asked probably at the beginning of this hearing, and I apologize. Navy Upper Tier is going to be able to defend against offensive missiles going at what velocity?

General O'NEILL. Offensive missiles going to velocities up to——

Mr. HUNTER. What can Navy Upper Tier be projected to be able to shoot down?

General O'NEILL. Up to about 5 kilometers a second.

Mr. HUNTER. Five kilometers. Does that include the Taepo Dong missile North Korea is developing now, their 5 or 4 kilometer missile?

General O'NEILL. If it is a 5,000 kilometer range version, the answer is no. We do not know for sure what the range of the Taepo Dong is. The developmental constraints right now on Navy Upper Tier would be a maximum velocity of the target of about 5 kilometers a second, which goes with a missile of a range of about 3,000 kilometers to 3,500 kilometers.

Mr. HUNTER. So in the Taepo Dong missile, which some of our people think will be able to go in excess of 5,000 kilometers, it is too fast for Navy Upper Tier?

General O'NEILL. That is right.

Mr. HUNTER. How about THAAD? Can THAAD handle that missile?

General O'NEILL. No, sir.

Mr. HUNTER. Can THAAD go up to—what, 5 km, 4 km?

General O'NEILL. Same thing with a smaller footprint. THAAD would have a smaller footprint, but it can handle the 5 km per second.

Mr. HUNTER. Arrow cannot handle that speed?

General O'NEILL. No, sir.

Mr. HUNTER. Obviously, Patriot. Corps SAM. Far below that?

General O'NEILL. Far below that.

Mr. HUNTER. Let me ask you this question. Obviously, we have one problem that we have developed with what I call kind of an unusual fiction in the ABM discussion; we have associated a speed with ABM Treaty.

And the idea is obviously, under the ABM Treaty, you are free to defend your troops in theater, you can't build that into a national missile defense that would violate ABM. However, we are just talking about fast missiles and slow missiles, and presumably adversaries, if they have an opportunity to build and deploy them, would just as soon shoot fast missiles at our troops in theater as slow missiles. If they shoot fast missiles that are beyond the 5 K a second, they have outsped the defenses, however robust they may be.

Can you—through elevating your launchers, could a North Korean Taepo Dong missile or one of the Chinese missiles be adjusted to fire into our troops in theater from a fairly close range without being shot at intercontinental distances?

General O'NEILL. Certainly. You could thrust terminate, blow a port hole in the side of the rocket engine, and it vents its excess thrust. So you could take a system with a range of 1,000 kilometers and make it 900, 800, 700, 600.

Mr. HUNTER. At that point, we could shoot it down?

General O'NEILL. Slow it down.

Mr. HUNTER. Can you shoot a long-distance missile from a short distance in such a way that it enters at a velocity so that you can shoot it down with a theater defense?

General O'NEILL. You shoot it straight up and it comes straight down. It is up and down. You could go 5,000 kilometers up and straight down.

Mr. HUNTER. General, as a guy who is pretty strong in your statement that rejects the idea that you can't defend your troops against some systems that are declared sacred or off limits, you can't stop them when they are imploding among your troops, do you have any ideas on how we deal with that problem? And that is the problem of trying to protect troops in theater against adversaries that have broken the code, that we are not going to build defense systems that can shoot down fast missiles because of this agreement with the Soviets. They break that code and design fast missiles to use in theater; how do we handle that?

General O'NEILL. As soon as it becomes clear that they have such a weapon and intend to use it, you have to reassess our capabilities, and if you realize our capabilities don't exist, then you have to approach some clear understanding with the Russians, for example, that this threat has just emerged, the North Koreans have it and we have to be able to do something about it. If you make that decision, then there would be some agreement that would have to be reached.

Mr. HUNTER. Have we done that yet, to your knowledge, approached the Russians with respect to the problem?

General O'NEILL. We right now are in discussions with the Russians about this issue of TMD and NMD. The U.S. position right now is that the obvious break point is a velocity of about 5 kilometers a second and a range of about 3,000 to 3,500 kilometers. That was agreed by us and them. So the Taepo Dong appearing on the horizon is a new consideration.

Mr. HUNTER. Would you say that the old classic designation of theater defense missiles versus national missile defense missiles as a function of velocity is no longer valid, assuming you want to defend your troops in theater.

General O'NEILL. The issue is certainly clouded.

Mr. HUNTER. Does anyone else have a comment on that? That is a problem we are going to have to wrestle with in this committee.

General BLACK. It is probably not a complete answer. It is clouded, but the fact that a rogue nation or any nation would have a missile that can travel more than 5 kilometers a second would choose to use that in a theater-type conflict, it exists, it has existed as long as the Soviet Union, now Russia, China, or the others have

had that capability. The premise has always been that they would not use an intercontinental ballistic missile in a theater fight.

If you go back to our INF Treaty with the Soviet Union, we restricted several of our weapons and eliminated some that we had spent good money on that said, we aren't going to build a weapon that will go beyond 500 kilometers.

Mr. HUNTER. But in those days we and the Soviet Union were the only players. For example, North Korea doesn't yet have Taepo Dong, but will have. And the Chinese if they proceed with arms sales with CSS 2, they will have—the recipient of those arms sales will have that capability and we will have a new problem.

It seems to me, if I were an adversary and wanted to hit your young people in their foxholes and knew that you had the ability to defend against slow missiles but not fast ones, I would buy some fast ones and I would point the barrel straight up and I would bring them in quick. And you wouldn't be able to get them because of an agreement we made with some people who are 6,000 miles away and who speak a different language.

I just raise that because I think that is an issue we are going to have to work through here, and I hope that you would raise—at least until we figure out what we are going to do here—strong objections from a parochial point of view; that is, defending your Army personnel and your sailors is—doggone it, don't limit us by velocity now that velocity is becoming an invalid gauge of what a theater ballistic missile is. I would hope that we would at least have a breathing spell to try to figure this out.

One last question. We had the space communications folks in and all of us on this committee wrestled with this problem of trying to streamline the procurement system, on both sides of the aisle. I came in as a freshman 14 years ago and Dave McCurdy and I were going to clear things up in 2 weeks. It didn't happen.

The tin cap people told us how they procure stuff in a very streamlined way. Instead of using a million specs, they have general goals and tell their guys, you go out and get this stuff, all you have to do is produce capability; we don't care if you turn in 1,800 reports.

My question is, you are probably aware of the tin cap; can we employ—if this is a national priority, can we employ some of this streamlined acquisition program like a tin cap to missile defense?

General O'NEILL. Well, sir, the answer is, yes, we certainly can. The strategy right now in Dr. Kaminski's office—and I work for him—who is the Under Secretary for Acquisition and Technology, is to streamline in every way, shape, and manner. We just went through the milestone, the first milestone for space-based infrared, which is the geosynchronous follow-on to the DSP; and the documentation for that milestone typically would be about 6 or 7 feet tall. I wouldn't be able to pick it up. It was 34 pages, and that was based upon Dr. Kaminski saying it is—I want everybody in the room to be able to read it when I come to one of these Defense Acquisition Board meetings, and those of you who protect your little part of the Pentagon, whether it is spare parts or airplane drivers or whatever, you all have to get this thing worked to the point where we can have an understandable program with very limited streamlined documentation.

I couldn't believe it. It was the first time I was able to read all the documentation for a major milestone on a very large program, and it was only 34 pages long and it was magnificent. It had his push and that is what allowed all the problems that the Air Force normally has getting through the bureaucracy to melt away.

The problems melted away. The Air Force was very happy to go with a document this thick.

I think we can do that. If the leadership thinks you are interested in that, that will make them feel a lot better.

Mr. HUNTER. We want to see this stuff implemented. I know Dr. Kaminski's heart is in the right place. The tin cap people do this.

Let me ask General Hawley, and I will yield to my colleagues.

Let me ask you, one interesting aspect of shooting these things down is getting them at boost phase. The idea of using UAV's, if you will, and using the UAV either to launch a small missile, as a missile is rolled out, or turn itself into a little kamakazi and follow that system down and hit it with the UAV itself, are you doing anything there?

General HAWLEY. Obviously—are you talking to TAC–OPs, which is outside of the BMDO?

General O'NEILL. Boost phase intercept.

General HAWLEY. In general, the Air Force philosophy is, get them as soon as you can; and maybe that is, get them on the ground before launch, after launch, but if you haven't gotten them there, get them in the boost phase.

There is an Air Force laser program that is in a risk reduction phase, has a way to go before we build a demonstrator, probably another year before we make that decision, because it is directed energy and technically very challenging, but it looks like it has pay off.

We are encouraged by the progress it has made in the last year, and it has demonstrated its lethality. So that is an Air Force program that is separate from, and at one time, was under BMDO, but now has moved to the Air Force to execute. We fully support the airborne interceptor program, and it is another technical approach as to how to get these things in the boost phase which we do believe has high payoff while the weapons are under high stress.

Mr. HUNTER. Thank you.

I am going to yield to the ranking member of the full committee for any closing comments or questions and then to the chair of the R&D Subcommittee.

Mr. DELLUMS. I have no questions.

Mr. HUNTER. I thank the gentleman. It is a privilege to have the ranking member with us all day.

Mr. Weldon.

Mr. WELDON. I would just echo your comments for the ranking member to sit through the entire hearing.

General, this committee from my standpoint—and the members have confidence in you and your leadership. We want to work with you; we are not here to upset the apple cart, and we are not putting ourselves in as experts.

A careful, deliberate approach with measurable milestones where we can see what we are getting, where we can know beforehand where our dollars are going, is going to be the success to move for-

ward. We are in a different era now, and we can have tough fights about how far to go and when to deploy as the days go by, but I think if you keep on the course you are on right now that you will find you have the bipartisan support of members of this committee and the Congress itself. Thank you.

General O'NEILL. Thank you.

Mr. HUNTER. The hearing is adjourned.

[Whereupon, at 5:42 p.m., the joint subcommittees were recessed.]

[The following questions were submitted for the record:]

ACCELERATE TMD AND NMD

Mr. Hunter: What funds would be required to accelerate the TMD and NMD systems?

Gen. O'Neill: In regard to TMD: Approximately $300M could be used effectively in FY1996.

For the past several years, TMD has been BMDO's top priority program, receiving between 65%-75% (approximately $2B/yr) of the total BMDO budget. The BUR decision to proceed with the acquisition of the TMD "Core" (PAC-3, Navy Lower Tier, and THAAD) has been implemented to the maximum extent and on the shortest schedule possible within BUR constraints. We have evaluated the extent and cost of accelerating (and in some cases "fixing") the entire BMDO program (see Attachment A). There is little acceleration possible for the TMD Core, but $150M could be reasonably spent on risk reduction activities and fixes that would greatly increase our ability to maintain current schedules.

Given the level of funding reductions in the Core for FY94 and FY95 (including undistributed reductions which impacted the Core), I would distribute an additional $150 million for FY96 in the following approximate amounts:

PAC-3: $40 million
Navy Area TBMD: $50 million
THAAD System: $60 million

In the area of Advanced TMD systems, the Navy Upper Tier could be accelerated with the addition of $150M in FY1996 funding, but it must be remembered that in order to follow through to a real system soon after the turn of the century, additional funding of $150M-$200M per year would be needed for at least three years, followed by requirements of up to $1B per year until the system is fully fielded.

BMD Program Funding
(Attachment A to HNSC 1)

The Fiscal Year 1996 President's Budget Request for the Ballistic Missile Defense program is $2.913 billion. Within this top-level funding, BMD programs and funding are prioritized in consonance with the Department's 1993 Bottom-up Review. First, to meet the existing missile threat to forward deployed U.S. and allied forces, we are developing and deploying increasingly capable Theater Missile Defenses (TMD); as second priority, as a hedge against the emergence of long-range ballistic missile threats, we are developing options to deploy a National Missile Defense (NMD) for the United States; and, as a third priority, we continue to support limited research on more advanced BMD technologies to keep pace with the threat and improve performance of TMD and NMD systems. Funding allocations within BMD are: $2,330 million for TMD or 80 percent; $397 million for NMD or 14 percent; and $184 million for Technology or 6 percent of the BMD budget.

During several Congressional hearings on the BMD program, Members have raised the question of how much additional resources the BMD program could effectively use and how these funds would be allocated. In light of these questions, I have reviewed the BMD program, the impact of last year's budget reductions, and the schedule of several key programs in order to recommend where additional resources could best be applied.

If the Congress elected to authorize and appropriate an additional $1,200 million dollars for the BMD program, these funds could be effectively used in several key BMD programs to: accelerate development efforts; preserve early deployment options for a National Missile Defense system; and protect current Theater Missile Defense systems' acquisition schedules. Within this framework, I would allocate additional resources as follows:

- o $600 million for National Missile Defense programs
  - -$450 million for National Missile Defense Systems Elements
  - -$150 million for the Space & Missile Tracking System
- o $300 million for Advanced Technology programs
- o $300 million dollars for Theater Missile Defense programs

Such funding would result in a top level of $4,100 million for BMD, with an allocation of: $484 million for Advanced Technology or 12 percent; $997 million for NMD or 24 percent; and $2,630 million for TMD or 64 percent of the total funding level. If fewer dollars were available for increased BMD funding, I would allocate them in approximately the same proportion as shown above.

National Missile Defense

The budget request for our NMD Technology Readiness Program is roughly $400 million per year. The program is based on a strategy of technology readiness. First, readiness with capability that increases incrementally to perform fully against both simple and complex potential threats. Second, readiness to build and deploy a system quickly as we see threats emerging. In the next 3 years, the technological capability will be achieved which could address a limited ballistic missile attack. This capability could be operational in 3-4 years after a decision to deploy is made.

I would commit one-half of the additional resources to NMD. With an additional $600 million for NMD, I would spend: $450 million to support NMD system element development efforts and $150 million for the Space & Missile Tracking System (SMTS). These expenditures would allow the Department the capability to move out smartly on the "two plus two" NMD excursion. An additional $150 million in 1996 (and similar amounts in following years) for the SMTS program would allow the Department to accelerate the development and acquisition of SMTS to support both TMD system elements and early deployment options for an NMD system as much as 3 years. The over-the-horizon sensing -- inherent in SMTS -- is a critical requirement to make effective use of all ballistic missile defense systems, either strategic or theater.

Advanced Technology Programs

Funding for BMD advanced technology programs are only supported through the Ballistic Missile Defense Organization. Over the past several years, BMDO's technology program has been reduced from a level of $1,800 million in Fiscal Year 1987 to this year's request of $184 million (which includes the Technology program's share in management resources). The advanced technology program funds critical component technology efforts that support both future theater and national missile defense systems, and pursue advanced technology approaches to countering evolving missile threats and potential countermeasures to our defensive systems.

If an additional $300 million was available for advanced technology programs, I would allocate: $150 million for the integration of Directed Energy systems and technologies rather than termination; $50 million to sustain an advanced Kinetic Energy effort, including space-based interceptor technologies; $70 million for development of advanced sensors and sensor component technologies; and $30 million to support BMD-specific tech base activities. These combined efforts would represent a revitalization of the third -- and currently weakest -- leg of the "three legged BMD stool" of TMD, NMD and Technology. Such an effort would allow BMDO to use its technology program to credibly pursue pre-planned product improvement and advanced capability efforts for both national and theater missile defense systems and technologies.

Theater Missile Defense

With $300 million in additional funding for TMD programs, I would recommend the following allocations: $40 million for PAC-3; $50 million for Navy Area (Lower Tier) Defense; $60 million for Theater High-Altitude Area Defense (THAAD); and $150 million for Navy Theater Wide (Upper Tier) Defense. Overall, this increase would allow BMDO and its Executing Agents to effectively manage critical schedule and technology risk issues.

PAC-3: Funds recommended for the PAC-3 system -- about $40 million -- would be applied to ensure that its acquisition schedule is effectively maintained.

Navy Area (Lower Tier) Defense: The $50 million recommended for the Navy Area Defense program would allow the Department to recover some of the schedule slippage incurred from the appropriated Fiscal Year 1995 budget reductions. This one-time investment would keep a critical core TMD acquisition program essentially on its proposed schedule which provides an option for a User Operational Evaluation System (UOES) in Fiscal Year 1998 and a First Unit Equipped (FUE) in Fiscal Year 2000. As I have testified, I consider the Navy Area Defense program a critical core TMD effort, and an important building block toward a Navy Theater Wide Defense system.

THAAD: The THAAD system is the centerpiece of the core TMD acquisition programs, since it is the only system designed to engage and intercept longer-range theater-class ballistic missiles at high altitudes. The recommended $60 million increase for THAAD would allow us to maintain current schedules. As a core TMD acquisition program, it is important that we maintain the integrity of THAAD's development and production schedule. An important element of our acquisition strategy for THAAD is to develop a UOES capability by FY 1997 in order to enable the user to gain early experience on prototypical hardware and to allow the developer to exploit user insights to improve the system during the engineering and manufacturing development (EMD) phase. This early contingency capability will also be available to the warfighter for possible deployment if an emergency or contingency warrants. We plan to begin deployment of the objective THAAD system in Fiscal Year 2002.

Navy Theater Wide (Upper Tier) Defense: The recommended funding increase of $150 million for the Navy Theater Wide Defense program would allow the Department to conduct additional flight experiments to fully validate the integration of LEAP interceptor technology with the Standard Missile Block IV A and AEGIS Combat Weapon System. BMDO and the Navy have conducted two such LEAP flight experiments. The Navy Theater Wide Defense system would utilize an interceptor with exoatmospheric capability, such as a marinized variant of the THAAD interceptor missile or the LEAP projectile on a Standard Missile. We are currently conducting a Cost and Operational Effectiveness Analysis (COEA) to assess these interceptor alternatives. Funding additional LEAP flight experiments would allow the Department to make a fully informed decision on the appropriate interceptor approach for the Navy Theater Wide Defense system.

Conclusion

If Congress should not appropriate and authorize the full additional $1,200M, we would scale back each program proportionately.

In regard to NMD: Approximately $600 million in additional funding over the President's Budget Request for NMD could be used effectively in FY1996.

Since the BUR decision in 1993, BMDO has been pursuing NMD as a "Technology Readiness" rather than an acquisition program at about the $400 million/year level (after the move of the Space and Missile Tracking System (SMTS) funding line to the Air Force). Under this philosophy, we continue to technically develop and engineer individual NMD elements (Ground-Based Interceptor; Ground-Based Radar; SMTS; and Battle Management, Command, Control, and Communications [BMC3]) while working in parallel on low-cost deployment activities which significantly shorten deployment schedules if and when a decision to defend the United States is made. Therefore, unlike Theater Missile Defense (TMD), very significant risk reduction and schedule acceleration to deploy an NMD system is possible, since all parts of the program are severely funding limited.

We have evaluated the extent and cost of accelerating (and in some cases "fixing") the entire BMDO program (see Attachment A). $450 million per year for two years starting in FY1996 could be used to accelerate and reduce risk for the ground-based NMD elements, while an additional $150 million per year to accelerate SMTS is critical not only to an NMD system effective to the entire range of sophisticated threats from the Former Soviet Union, but to TMD as well. In addition, we recommend that the management responsibility and funding for SMTS be returned to BMDO, since we are the major stakeholder for the low element of the Space-Based Infrared System (SBIRS).

$1200 million additional investment over two years in NMD elements allows a decision to deploy a thin layer of defense in an additional 2 years at approximately $5 billion.

BMD Program Funding
(Attachment B to HNSC 1)

The Fiscal Year 1996 President's Budget Request for the Ballistic Missile Defense program is $2.913 billion. Within this top-level funding, BMD programs and funding are prioritized in consonance with the Department's 1993 Bottom-up Review. First, to meet the existing missile threat to forward deployed U.S. and allied forces, we are developing and deploying increasingly capable Theater Missile Defenses (TMD); as second priority, as a hedge

against the emergence of long-range ballistic missile threats, we are developing options to deploy a National Missile Defense (NMD) for the United States; and, as a third priority, we continue to support limited research on more advanced BMD technologies to keep pace with the threat and improve performance of TMD and NMD systems. Funding allocations within BMD are: $2,330 million for TMD or 80 percent; $397 million for NMD or 14 percent; and $184 million for Technology or 6 percent of the BMD budget.

During several Congressional hearings on the BMD program, Members have raised the question of how much additional resources the BMD program could effectively use and how these funds would be allocated. In light of these questions, I have reviewed the BMD program, the impact of last year's budget reductions, and the schedule of several key programs in order to recommend where additional resources could best be applied.

If the Congress elected to authorize and appropriate an additional $1,200 million dollars for the BMD program, these funds could be effectively used in several key BMD programs to: accelerate development efforts; preserve early deployment options for a National Missile Defense system; and protect current Theater Missile Defense systems' acquisition schedules. Within this framework, I would allocate additional resources as follows:

- o $600 million for National Missile Defense programs
  - -$450 million for National Missile Defense Systems Elements
  - -$150 million for the Space & Missile Tracking System
- o $300 million for Advanced Technology programs
- o $300 million dollars for Theater Missile Defense programs

Such funding would result in a top level of $4,100 million for BMD, with an allocation of: $484 million for Advanced Technology or 12 percent; $997 million for NMD or 24 percent; and $2,630 million for TMD or 64 percent of the total funding level. If fewer dollars were available for increased BMD funding, I would allocate them in approximately the same proportion as shown above.

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I would commit one-half of the additional resources to NMD. With an additional $600 million for NMD, I would spend: $450 million to support NMD system element development efforts and $150 million for the Space & Missile Tracking System (SMTS). These expenditures would allow the Department the capability to move out smartly on the "two plus two" NMD excursion. An additional $150 million in 1996 (and similar amounts in following years) for the SMTS program would allow the Department to accelerate the development and acquisition of SMTS to support both TMD system elements and early deployment options for an NMD system as much as 3 years. The over-the-horizon sensing -- inherent in SMTS -- is a critical requirement to make effective use of all ballistic missile defense systems, either strategic or theater.

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Conclusion

If Congress should not appropriate and authorize the full additional $1,200M, we would scale back each program proportionatelv

BMDO PRIORITIES

Mr. Bateman: What are BMDO's priorities and how much money could BMDO intelligently use?

Gen. O'Neill: The Fiscal Year 1996 President's Budget Request for the Ballistic Missile Defense program is $2.913 billion. Within this top-level funding, BMD programs and funding are prioritized in consonance with the Department's 1993 Bottom-up Review. First, to meet the existing missile threat to forward deployed U.S. and allied forces, we are developing and deploying increasingly capable Theater Missile Defenses (TMD); as second priority, as a hedge against the emergence of long-range ballistic missile threats, we are developing options to deploy a National Missile Defense (NMD) for the United States; and, as a third priority, we continue to support limited research on more advanced BMD technologies to keep pace with the threat and improve performance of TMD and NMD systems. Funding allocations within BMD are: $2,330 million for TMD or 80 percent; $397 million for NMD or 14 percent; and $184 million for Technology or 6 percent of the BMD budget.

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Conclusion

If Congress should not appropriate and authorize the full additional $1,200M, we would scale back each program proportionately.

ABM TREATY CONSTRAINTS ON TMD AND NMD

Mr. Bateman: How does the ABM Treaty constrain development and deployment of TMD and NMD?

Gen. O'Neill: The ABM treaty severely constrains any national missile defense program. Specifically, we are limited to deploying strategic defenses at a single site, Grand Forks, North Dakota, and may have no more than 100 interceptor missiles and launchers deployed at that site. National missile defenses may not be mobile or based at sea, in the air, or in space. The treaty requires that strategic missile defenses, even if fixed and land-based, that are based on other physical principles would be subject to discussion and agreement in the ABM Treaty's Standing Consultative Commission (SCC).

The ABM Treaty does not limit TMD systems per se. Article VI(a) prohibits giving non-ABM systems capability to counter strategic ballistic missiles or testing them in an ABM mode. This article was intended to prevent a situation in which the treaty's goal of maintaining strategic stability was undermined by upgrading widely-deployed non-ABM systems (such as air defenses) into a nationwide ABM system. But, the Treaty offers little guidance for determining whether "capabilities to counter" strategic missiles have been given to theater defense systems and for discerning the dividing line between restricted ABM defenses and permitted TMD. In late 1993, the United States initiated discussion in the SCC to determine that "demarcation" line.

ABM TREATY REVIEW/REVISION

Mr. Bateman: Should we be aggressively seeking review/revision of the ABM Treaty?

Gen. O'Neill: Whether the ABM Treaty should be "aggressively" revisited or not is a policy issue that will be resolved by others within the Executive and Legislative Branches. As a system developer, I will always want as few constraints -- of any kind -- as possible. But I recognize that ABM Treaty constraints exist and my task is to develop the best possible system within those constraints.

My program is continuously reviewed for Treaty compliance. Each of my experiments and tests, in both TMD and NMD, is examined in detail by independent experts who must certify to the Under Secretary of Defense (Acquisition and Technology) that the Treaty is being observed. The USD (A&T), in turn, certifies the compliance of those activities for the Department of Defense.

I have two concerns about the ABM Treaty: first that the TMD program will face difficulties until a clear demarcation is identified which will protect the development and deployment of needed missile defenses for our forward deployed forces, and second, that if and when a serious missile threat to the U.S. homeland appears, the NMD program can be enabled to respond swiftly and efficiently.

SPACE BASED NMD

Mr. Hunter: Please provide, for the record, a detailed analysis of the costs, technical risk, and performance to deploy a NMD system based entirely on space-based elements, which could be deployed between the years 2000 and 2004.

Gen. O'Neill: A detailed answer to these questions is being prepared for a report requested by Chairman Spence, which will respond to these questions.

Our top-level response is given in Table 1. In general we believe that the timelines shown in Table 1 represent the shortest achievable for the various NMD options listed.

For the Full Operational Capability configuration:

Each option shown has significantly higher performance against threats of increasing numbers and sophistication (decoys, penaids, jammers, etc.). Option 4 has the highest standalone performance, providing a defense with only a few "leakers" out of 200 or more warheads. Against this threat, adding a modest ground-based tier (an example of Option 5) makes the NMD system near-perfect. Option 3 defends to a level of approximately 20 leakers against the same threat, Options 2 can defend to greater than 80 percent effectiveness with 600 missiles and 3 sites (Maine, Washington (state) and Hawaii), while Option 1 can defend to less than 50 percent effectiveness in this same scenario.

Options 3 and 4 are estimated to cost essentially the same, somewhere between $15-20 billion. Option 2 is estimated to cost roughly $10 billion, while Option 1 costs $5-7 billion.

TABLE 1 - NMD OPTIONS

	96	97	98	99	00	01	02	03	04	05	06	07	08
1) Ground-based interceptors and sensors					20msls/1site				300msls/3sites				
2) Ground-based interceptors and ground- and space-based sensors							200msls/3sites/12SMTS				600msls/3sites/24 SMTS		
3) Space-based interceptors and sensors							200SBIs/12SMTS			1000SBIs/18SMTS			
4) Space-based lasers* (sensors integral)										12SBLs		20SBLs	

5) Combinations - Various timelines, costs and capabilities

* For Space-based lasers, results shown are from an industry study requested by Senator Thurmond. BMDO is currently assessing these data and expect to include our results in the response to Mr. Spence.

GROUND BASED NMD/GROUND AND SPACE BASED NMD

Mr. Hunter: Provide similar assessments for a NMD system that utilizes entirely ground-based elements and for a NMD system that uses both ground- and space-based elements. Use the same 2000-2004 timeline in each case.

Gen. O'Neill: A detailed answer to these questions is being prepared for a report requested by Chairman Spence, which will respond to these questions.

Our top-level response is given in Table 1. In general we believe that the timelines shown in Table 1 represent the shortest achievable for the various NMD options listed.

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NAVY UPPER TIER

Mr. Dornan: For each year that Navy receives less than $170M, what is the impact with respect to delay in fielding Navy Upper Tier?

Gen. O'Neill: The next Major Defense Acquisition program (MDAP) within the BMDO program is scheduled to be in 1998. $170M allocated to Navy Upper Tier would allow:

1) Significant risk reduction between now and the scheduled MDAP start, which through acquisition streamlining would allow entrance into the engineering and manufacturing development phase.

2) The start of that MDAP (assuming Navy Upper Tier is selected for further development) may be accelerated by up to one year.

Mr. Hunter: Please provide for the record the details of Navy Upper Tier funding required for outyears in order to accelerate program development.

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TMD AND NMD ACCELERATION

Mr. Hunter: How would BMDO accelerate the current TMD and NMD programs? Include 2+2 and baseline additions. Please provide a matrix of options and associated costs.

Gen. O'Neill: The Fiscal Year 1996 President's Budget Request for the Ballistic Missile Defense program is $2.913 billion. Within this top-level funding, BMD programs and funding are prioritized in consonance with the Department's 1993 Bottom-up Review. First, to meet the existing missile threat to forward deployed U.S. and allied forces, we are developing and deploying increasingly capable Theater Missile Defenses (TMD); as second priority, as a hedge against the emergence of long-range ballistic missile threats, we are developing options to deploy a National Missile Defense (NMD) for the United States; and, as a third priority, we continue to support limited research on more advanced BMD technologies to keep pace with the threat and improve performance of TMD and NMD systems. Funding allocations within BMD are: $2,330 million for TMD or 80 percent; $397 million for NMD or 14 percent; and $184 million for Technology or 6 percent of the BMD budget.

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Advanced Technology Programs

Funding for BMD advanced technology programs are only supported through the Ballistic Missile Defense Organization. Over the past several years, BMDO's technology program has been reduced from a level of $1,800 million in Fiscal Year 1987 to this year's request of $184 million (which includes the Technology program's share in management resources). The advanced technology program funds critical component technology efforts that support both future theater and national missile defense systems, and pursue advanced technology approaches to countering evolving missile threats and potential countermeasures to our defensive systems.

If an additional $300 million was available for advanced technology programs, I would allocate: $150 million for the integration of Directed Energy systems and technologies rather than termination; $50 million to sustain an advanced Kinetic Energy effort, including space-based interceptor technologies; $70 million for development of advanced sensors and sensor component technologies; and $30 million to support BMD-specific tech base activities. These combined efforts would represent a revitalization of the third -- and currently weakest -- leg of the "three legged BMD stool" of TMD, NMD and Technology. Such an effort would allow BMDO to use its technology program to credibly pursue pre-planned product improvement and advanced capability efforts for both national and theater missile defense systems and technologies.

Theater Missile Defense

With $300 million in additional funding for TMD programs, I would recommend the following allocations: $40 million for PAC-3; $50 million for Navy Area (Lower Tier) Defense; $60 million for Theater High-Altitude Area Defense (THAAD); and $150 million for Navy Theater Wide (Upper Tier) Defense. Overall, this increase would allow BMDO and its Executing Agents to effectively manage critical schedule and technology risk issues.

PAC-3: Funds recommended for the PAC-3 system -- about $40 million -- would be applied to ensure that its acquisition schedule is effectively maintained.

Navy Area (Lower Tier) Defense: The $50 million recommended for the Navy Area Defense program would allow the Department to recover some of the schedule slippage incurred from the appropriated Fiscal Year 1995 budget reductions. This one-time investment would keep a critical core TMD acquisition program essentially on its proposed schedule which provides an option for a User Operational Evaluation System (UOES) in Fiscal Year 1998 and a First Unit Equipped (FUE) in Fiscal Year 2000. As I have testified, I consider the Navy Area Defense program a critical core TMD effort, and an important building block toward a Navy Theater Wide Defense system.

THAAD: The THAAD system is the centerpiece of the core TMD acquisition programs, since it is the only system designed to engage and intercept longer-range theater-class ballistic missiles at high altitudes. The recommended $60 million increase for THAAD would allow us to maintain current schedules. As a core TMD acquisition program, it is important that we maintain the integrity of THAAD's development and production schedule. An important element of our acquisition strategy for THAAD is to develop a UOES capability by FY 1997 in order to enable the user to gain early experience on prototypical hardware and to allow the developer to exploit user insights to improve the system during the engineering and manufacturing development (EMD) phase. This early contingency capability will also be available to the warfighter for possible deployment if an emergency or contingency warrants. We plan to begin deployment of the objective THAAD system in Fiscal Year 2002.

Navy Theater Wide (Upper Tier) Defense: The recommended funding increase of $150 million for the Navy Theater Wide Defense program would allow the Department to conduct additional flight experiments to fully validate the integration of LEAP interceptor technology with the Standard Missile Block IV A and AEGIS Combat Weapon System. BMDO and the Navy have conducted two such LEAP flight experiments. The Navy Theater Wide Defense system would utilize an interceptor with exoatmospheric capability, such as a marinized variant of the THAAD interceptor missile or the LEAP projectile on a Standard Missile. We are currently conducting a Cost and Operational Effectiveness Analysis (COEA) to assess these interceptor alternatives. Funding additional LEAP flight experiments would allow the Department to make a fully informed decision on the appropriate interceptor approach for the Navy Theater Wide Defense system.

Conclusion

If Congress should not appropriate and authorize the full additional $1,200M, we would scale back each program proportionately.

OVERALL FUNDING FOR MISSILE DEFENSE

Mr. Hunter: How can the Administration claim it supports a robust missile defense effort when this year's budget request is the lowest since the program's inception over a decade ago?

Gen. O'Neill: The Administration's ballistic missile defense effort is a focused and prudent response to real world threats. Despite funding reductions from the previous administration's plans, we are aggressively working to develop and deploy defenses to protect against ballistic missile threats -- initially against theater ballistic missiles and later, if necessary, against long-range threats to the United States that could emerge after the turn of the decade.

Funding for Theater Missile Defense (TMD) is now sufficient to put real, improved TMD capability in the hands of the warfighters within the next few years: A prototype of THAAD will be available in FY 1997 and a prototype of the Navy area defense system (lower tier) will be available in FY 1998, the same year that the improved Patriot PAC-3 system will enter the force. Given overall defense funding constraints, I believe we have a robust TMD program that responds to the current and emerging threat. I have also stated that if additional funds were made available for TMD, I would fully fund development of the Navy Upper Tier, MEADS and BPI, the three advanced capabilities that are now in the concept exploration phase.

In considering the proper approach to national missile defense, the administration examined a range of program options. In evaluating these options, three main factors were considered: technological promise, responsiveness to the projected threat, and ABM Treaty compliance. Given the nature of the threat, we decided to fund a technology readiness program that would provide a hedge against the emergence of a greater long-range missile threat than is now projected. In the next 2-3 years, functional demonstrations of a ground based interceptor, ground-based radar, and the BMC3 that could comprise an initial system will be conducted. Supporting these demonstrations will be the requisite system engineering, deployment planning and risk reducing technology efforts that will allow an initial system to be deployed quickly (within 2-3 years) if a threat emerges.

In summary, we are pursuing a robust TMD program, spending about $2 billion a year to develop and deploy theater missile defenses by the end of this decade. We have also established a program to develop an ABM Treaty compliant national missile defense system within the next 4-6 years to provide a defense of the United States against a limited ballistic missile attack, should we decide the threat warrants deployment.

Mr. Hunter: How does your budget request for FY 1996 compare with the amount proposed by the previous administration?

Gen. O'Neill: $ in thousands

	FY1996
Bush Administration	$7,364,516
Clinton Administration	$2,912,916

Mr. Hunter: If the Congress added funds for missile defense in FY 1996, what would be your priorities, and why? Which programs would you plus up?

Gen. O'Neill: The Fiscal Year 1996 President's Budget Request for the Ballistic Missile Defense program is $2.913 billion. Within this top-level funding, BMD programs and funding are prioritized in consonance with the Department's 1993 Bottom-up Review. First, to meet the existing missile threat to forward deployed U.S. and allied forces, we are developing and deploying increasingly capable Theater Missile Defenses (TMD); as second priority, as a hedge against the emergence of long-range ballistic missile threats, we are developing options to deploy an ABM Treaty compliant National Missile Defense (NMD) for the United States; and, as a third priority, we continue to support limited research on more advanced BMD technologies to keep pace with the threat and improve performance of TMD and NMD systems. Funding allocations within BMD are: $2,330 million for TMD or 80 percent; $397 million for NMD or 14 percent; and $184 million for Technology or 6 percent of the BMD budget.

During several Congressional hearings on the BMD program, Members have raised the question of how much additional resources the BMD program could effectively use and how these funds would be allocated. In light of these questions, I have reviewed the BMD program, the impact of last year's budget reductions, and the schedule of several key programs in order to recommend where additional resources could best be applied.

If the Congress elected to authorize and appropriate an additional $1,200 million dollars for the BMD program, these funds could be effectively used in several key BMD programs to: accelerate development efforts; preserve early deployment options for a National Missile Defense system; and protect current Theater Missile Defense systems' acquisition schedules. Within this framework, I would allocate additional resources as follows:

- o $600 million for National Missile Defense programs
  - -$450 million for National Missile Defense Systems Elements
  - -$150 million for the Space & Missile Tracking System
- o $300 million for Advanced Technology programs
- o $300 million dollars for Theater Missile Defense programs

Such funding would result in a top level of $4,100 million for BMD, with an allocation of: $484 million for Advanced Technology or 12 percent; $997 million for NMD or 24 percent; and $2,630 million for TMD or 64 percent of the total funding level. If fewer dollars were available for increased BMD funding, I would allocate them in approximately the same proportion as above.

National Missile Defense

The budget request for our NMD Technology Readiness Program is roughly $400 million per year. The program is based on a strategy of technology readiness. First, readiness with capability that increases incrementally to perform fully against both simple and complex potential threats. Second, readiness to build and deploy a system quickly as we see threats emerging. In the next 3 years, the technological capability will be achieved which could address a limited ballistic missile attack. This capability could be operational in 3-4 years after a decision to deploy is made.

I would commit one-half of the additional resources to NMD. With an additional $600 million for NMD, I would spend: $450 million to support NMD system element development efforts and $150 million for the Space & Missile Tracking System (SMTS). These expenditures would allow the Department the capability to move out smartly on the "two plus two" NMD excursion. An additional $150 million in 1996 (and similar amounts in following years) for the SMTS program would allow the Department to accelerate the development and acquisition of SMTS to support both TMD system elements and early deployment options for an NMD system as much as 3 years. The over-the-horizon sensing -- inherent in SMTS -- is a critical requirement to make effective use of all ballistic missile defense systems, either strategic or theater.

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Conclusion

If Congress should not appropriate and authorize the full additional $1,200M, we would scale back each program proportionately.

Mr. Hunter: What can you tell us about the out-year budgets for missile defense? What is the budget profile for missile defenses over the Future Year Defense Plan (FYDP)

Gen. O'Neill: The BMD program is a focused, prudent response to the existing and emerging ballistic missile threat to the United States, our forces overseas, and our friends and allies. The Department is dedicated to getting "rubber on the ramp" for urgently needed TMD systems for the warfighter. In this regard, the BMDO budget will fund the acquisition of TMD material and systems to be deployed throughout the 1990's. When the core TMD systems are deployed, U.S. forces overseas will be protected against the full spectrum of short and longer-range theater-class ballistic missiles. Meanwhile, BMDO is committed to maintaining a well-focused technology readiness program for National Missile Defense, including early deployment options if required. The Department remains committed to ensuring that as new ballistic threats arise, highly effective ballistic missile defenses will be in place to defend our forces as they go in harm's way. In addition, as new ballistic missile threats to the U.S. develop, the Department is committed to ensuring defensive systems are available to meet the threat.

BMDO's budget profile for missile defenses over the Future Year Defense Plan (FYDP) ($ in thousands): See attached chart

BMDO's Budget Profile for Missile Defenses over the Future Year Defense Plan (FYDP)

($ in thousands):

	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001
Theater Missile Defense							
TMD Adv Development	0	0	0	0	0	0	0
TMD Dem/Val	1,346,560	1,194,161	657,621	705,609	645,678	975,147	1,139,951
TMD EMD	350,217	519,180	1,045,406	1,071,662	792,164	357,170	165,735
Total TMD RDT&E	1,697,777	1,713,341	1,703,027	1,777,271	1,437,842	1,332,317	1,305,686
TMD MCA	0	16,177	7,661	19,993	6,989	1,642	1,642
Procurement	269,433	453,708	545,899	682,156	1,193,694	1,396,382	1,257,354
Total TMD	1,966,210	2,183,226	2,256,587	2,479,420	2,638,525	2,730,341	2,564,682

National Missile Defense	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001
NMD Dem/Val	390,224	370,621	399,038	398,368	398,345	398,499	398,499
NMD EMD	0	0	0	0	0	0	0
Total NMD RDT&E	390,224	370,621	399,038	398,368	398,345	398,499	398,499
NMD MCA	530	832	974	631	688	547	547
Procurement	0	0	0	0	0	0	0
Total NMD	390,754	371,453	400,012	398,999	399,033	399,046	399,046

Support Technology	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001
Expl Development	84,005	93,308	105,313	105,003	100,397	95,568	93,669
Support Tech Advanced Development	133,981	79,387	87,823	57,823	57,823	66,323	66,323
Support Technology MCA	0	0	0	0	0	0	0
Total Support Tech	217,986	172,695	193,136	162,826	158,220	161,891	159,992

	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001
Management	159,871	185,542	188,418	224,742	219,543	230,014	223,971

	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001
Total Program	2,734,821	2,912,916	3,038,153	3,265,987	3,415,321	3,521,292	3,347,691

MILITARY REQUIREMENTS FOR THEATER AND NATIONAL MISSILE DEFENSE

Mr. Hunter: Has the JROC validated A Military requirement for theater and national missile defense? Please describe those requirements. How often are those requirements updates?

Gen. O'Neill: National Missile Defense (NMD) requirements: The Joint Requirements and Oversight Council (JROC) validated the USCINCSPACE Operational Requirements for Phase I Strategic Ballistic missile defense 15 May 1987. The requirements were reviewed by the JROC in 1989 and 1991 and continue to be valid. Phase I requirements were focused on the Soviet strategic nuclear threat. The changing threat shifted toward providing protection against limited numbers of ballistic missiles. The updated Ballistic Missile Defense requirements Global Protection Against Limited Strikes (GPALS)/Battle Management Command, Control, and Communications (BMC3) were validated by the JROC in December 1992. The key performance parameters (KPPs) for NMD include US defense performance probability, overseas defense by space-based sensors and interceptors performance probability, operational availability, assured human control of system, and automated battle management. The GPALS/BMC3 Operational Requirements Document (ORD) evolved into the Capstone BMD ORD which is maintained by USSPACECOM and is updated annually. The JROC has not reviewed the Capstone BMD ORD since 1992.

Theater Missile Defense Requirements: The JROC validated the Theater Missile Defense (TMD) Mission Need Statement 18 November 1991. The Capstone BMD ORD includes overarching theater missile defense requirements which were validated by the JROC in December 1992. The KPPs for TMD include area defense, critical asset defense, defense in a nuclear environment, interfaces with strategic and supporting systems, in-theater transfer of sensor data, and reports for transmission to joint/combined/theater command and control centers. The JROC reviewed the requirements and validated the KPPs for the Upper Tier Theater Missile Defense System (UTTMDS) in January 1994. Requirements are reviewed by the JROC prior to major milestone decisions by the Defense Acquisition Board.

Mr. Hunter: According to the JROC-validated requirement for National Missile Defense (NMD), how effective does an NMD system have to be? What is the anticipated threat against which a U.S. NMD system must operate?

Gen. O'Neill: The NMD system must address numbers of missiles and warheads representing accidental, unauthorized, and authorized attacks that range from a minimum (threshold) requirement to a maximum (objective) requirement. The protection effectiveness required is stated in the classified BMD Capstone Operational Requirements Document (ORD) dated December 9, 1994.

NATIONAL MISSILE DEFENSE (NMD) OPTIONS, PERFORMANCE AND COSTS

Mr. Hunter: General O'Neill, do you agree with Secretary Perry's testimony before this committee that a limited, ground-based defense could be deployed by the year 2000 for approximately $5 billion? How effective would this system be against a few missiles launched against the United States by a rogue regime?

Gen. O'Neill: Yes, a limited, ground-based defense could be deployed by the year 2000 for approximately $5 billion. Details on system effectiveness are being evaluated and soon will be provided in the report requested by Chairman Spence.

Mr. Hunter: General O'Neill, please describe the approximate cost, performance, and technological risk associated with the following options: an NMD system with only ground-based elements deployed in the year 2000 (and in 2004).

Gen. O'Neill: A detailed answer to these questions is being prepared for the report requested by Chairman Spence, which will respond to these questions.

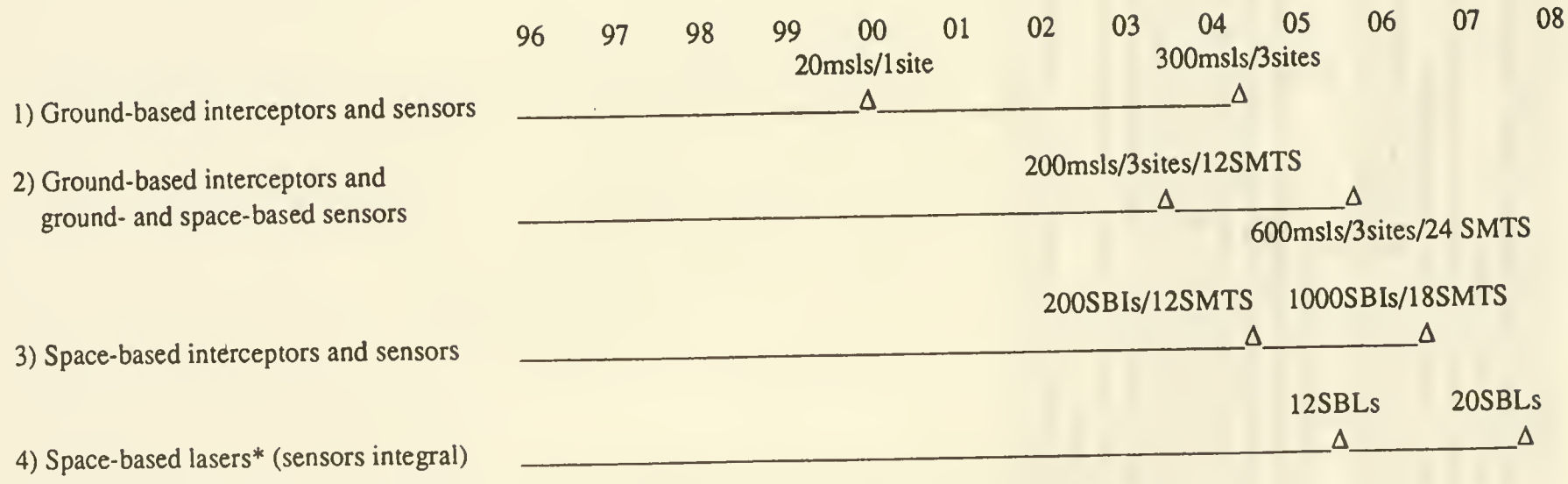
Our top-level response is given in Table 1. In general, we believe that the timelines shown in Table 1 represent the shortest achievable for the various NMD options listed.

For the Full Operational Capability configuration:

Each option shown has sequentially higher performance against threats of increasing numbers and sophistication (decoys, penaids, jammers, etc.). Option 4 has the highest standalone performance, providing a defense with only a few "leakers" out of 200 or more warheads. Against this threat, adding a modest ground-based tier (an example of Option 5) makes the NMD system near-perfect. Option 3 defends to a level of approximately 20 leakers against the same threat. Options 2 can defend to greater than 80 percent effectiveness with 600 missiles and 3 sites (Maine, Washington (state) and Hawaii), while Option 1 can defend to less than 50 percent effectiveness in this same scenario.

Options 3 and 4 are estimated to cost essentially the same, somewhere between $15-20 billion. Option 2 is estimated to cost roughly $10 billion, while Option 1 costs $5-7 billion.

TABLE 1 - NMD OPTIONS



5) Combinations - Various timelines, costs and capabilities

* For Space-based lasers, results shown are from an industry study requested by Senator Thurmond. BMDO is currently assessing these data and expect to include our results in the response to Mr. Spence.

NATIONAL MISSILE DEFENSE (NMD) OPTIONS, PERFORMANCE AND COSTS

Mr. Hunter: General O'Neill, please describe the approximate cost, performance, and technological risk associated with the following options: an NMD system with only space-based elements deployed in the year 2000 (and in 2004).

Gen. O'Neill: A detailed answer to these questions is being prepared for the report requested by Chairman Spence, which will respond to these questions.

Our top-level response is given in Table 1. In general, we believe that the timelines shown in Table 1 represent the shortest achievable for the various NMD options listed.

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TABLE 1 - NMD OPTIONS

	96	97	98	99	00	01	02	03	04	05	06	07	08
1) Ground-based interceptors and sensors					20msls/1site				300msls/3sites				
2) Ground-based interceptors and ground- and space-based sensors							200msls/3sites/12SMTS			600msls/3sites/24 SMTS			
3) Space-based interceptors and sensors							200SBIs/12SMTS			1000SBIs/18SMTS			
4) Space-based lasers* (sensors integral)										12SBLs		20SBLs	

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Mr. Hunter: General O'Neill, please describe the approximate cost, performance, and technological risk associated with the following options: an NMD system with ground- and space-based elements deployed in the year 2000 (and in 2004).

Gen. O'Neill: A detailed answer to these questions is being prepared for the report requested by Chairman Spence, which will respond to these questions.

Our top-level response is given in Table 1. In general, we believe that the timelines shown in Table 1 represent the shortest achievable for the various NMD options listed.

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NATIONAL MISSILE DEFENSE (NMD) OPTIONS, PERFORMANCE AND COSTS

Mr. Hunter: General Black, do you agree with General O'Neill's assessment of these options? What do you see as the major technical hurdles to developing and deploying an NMD system.

Gen. Black: I believe that options 1 & 2 are more effective than the perception portrayed by the choice of the particular figure of merit, "probability of no leakers." Both options 1 $ 2 could have a high probability of destroying 199-200 of the 200 reentry vehicles (RVs), however, when measured against the criteria of "no leakers", it is "50% effective", which may be misleading.

It was pointed out that Option 1 can defend to less than 50 percent effectiveness against a 200 RV attack with three sites and 300-600 ground based interceptors. Option 2, on the other hand, can defend to greater than 80% effectiveness. Our analysis concerning performance shows much greater effectiveness. With three sites, one in Washington state, one at Grand Forks, and one in Maine with 300-600 interceptors (Options 1 and 2, respectively), CONUS can be protected with a very high degree of confidence of no leakers. Analysis further shows that this effectiveness is based on the robustness of the ground based radar and the high probability of kill of the interceptor. It also shows that an Option 1 system consisting of ground-based interceptors (GBI), ground based radars (GBR), and upgraded early warning radars (UEWR) can have multiple shot opportunities, thereby giving very high system effectiveness. Option 2, with Space and Missile Tracking System (SMTS) and 600 interceptors, provides a longer time-line (battlespace) and improved system effectiveness.

Reasonable comparisons of system effectiveness should take into account factors such as, countermeasures, tactical employment (both offense and defense), environment, etc. Ground based systems, which have a long legacy of development and research, have their performance typically evaluated assuming "reasonable" offense responses. Space based systems have generally not been exposed to as much or as extensive scrutiny in terms of offense responses and consequently show better responses.

System performance measured only by the probability of "zero leakers" can distort the perceived value of a system. Small changes in systems and scenarios can have an exaggerated effect on this parameter alone.

On the subject of cost, I can speak only to the cost of the ground based components. Option 1 with 300 interceptors could be initially deployed in FY 2000, and the two additional sites deployed in FY 2002/2003. Total cost for the three site system would be approximately $8 billion The ground based components of Option 2 would cost an additional $3.5 billion to $4.5 billion; I cannot speak definitively to the cost of space based components, but intuitively the cost of developing, producing, and launching space-based systems is very high.

The majority of the technical hurdles have been overcome in previous testing; especially in the interceptor program. The greatest hurdle is the integration of the elements into a system for testing of the system as a whole. Although the technical hurdles are adequately addressed, funding constraints will slow our progress in implementing the program development plan.

Mr. Hunter: General O'Neill, please describe for us the results of the so-called "Tiger Team" study of NMD options. How much would such a program cost to implement? Has Secretary Perry approved this program? Have you received the approximately $60 million in additional FY1995 funds the study says is necessary to implement this option?

Gen. O'Neill: The Emergency Response System (ERS), which is a direct result of the Tiger Team study, is a deployment option that provides protection against emerging Rest of World (ROW) ballistic missile threats in as little as four years. The ERS is the most rapid deployment option and offers increased early performance. Since ERS utilizes far field sensors located near the threat origin, it is expected to provide excellent effectiveness for the entire United States in the near term against limited (under four warheads), unsophisticated (no penetration aids) attacks.

In order to implement the Emergency Response System option, the Department would require up to an additional $840 million in FY1995-1997 RDT&E funds. Of these funds, $440 million would be for essential activities to implement the option and $400 million for risk reduction efforts. Essential activities include: validating system design against early threats; validating EKV hardness; long-lead hardware for the EKV; validating the 7km per second booster

stack; defining and validating sensor modifications; designing, fabricating, integrating and testing BM/C3; evaluating the BM/C3 operator; site design and preparations; operations center organization; and completing advanced contracting actions. Risk reduction activities would include: maintaining two EKV contractors through flight testing; conducting EKV hover testing; conducting a robust system simulation and flight testing program beginning in FY1998; protecting the EKV program schedule; and maintaining the existing integrated kill vehicle safety net. This excursion could be deployed in two years after a deployment decision is made, at a cost of about $2-4 billion.

The Department has not approved any of the three excursion options for implementation and no additional FY1995 funds have been approved to implement any of the excursions.

Mr. Hunter: General O'Neill, how important is the Brilliant Eyes system to effective performance of an NMD system?

Gen. O'Neill: The Space and Missile Tracking System (SMTS, formerly known as Brilliant Eyes) is a critical element of the objective National Missile Defense architecture. SMTS will provide the over-the-horizon target tracking capability needed to provide a high-confidence, cost-effective defense of the United States. A low-altitude infrared satellite constellation, SMTS will provide unique precision tracking and discrimination data that cannot be duplicated by ground-based assets. These data allow for effective NMD system performance against sophisticated threats, such as larger numbers of small cold warheads, electronic countermeasures (ECM), and complex penetration aids or Multiple Independently Targeted Reentry Vehicle (MIRVed) systems. SMTS's ability to track over-the-horizon targets in their midcourse phase permits the earliest possible interceptor launch, thereby extending the battlespace and increasing the probability of kill.

THE CURRENT AND PROJECTED MISSILE THREAT

Mr. Hunter: General O'Neill, please describe the current and projected missile threat that U.S. TMD systems are being designed to defeat.

Gen. O'Neill: The U.S. TMD systems are being designed to defeat theater ballistic missiles having ranges between 80 km and 3,000 km. This encompasses many Third World missiles including SS-21s, SCUD-Bs and Cs, the Indian Agni, Chinese M-9s and M-11s, the North Korean No Dong and Taepo Dong-1, and the Chinese CSS-2.

Mr. Hunter: General O'Neill, which U.S. TMD systems currently under development will be capable of intercepting the North Korean Taepo Dong-2 missile?

Gen. O'Neill: None of the U.S. TMD systems currently under development is being designed to intercept the Taepo Dong-2.

Mr. Hunter: General O'Neill, what is the intelligence community's current assessment of when a new missile threat to the United States is likely to emerge?

Gen. O'Neill: The intelligence community is currently reassessing the future missile threat to the United States and plans to publish a National intelligence estimate on this subject in early summer.

THEATER HIGH ALTITUDE DEFENSE (THAAD)

Mr. Hunter: General O'Neill and General Black, how would you describe progress to date in the THAAD program? When is the first flight test scheduled to occur? The first intercept of a warhead? Why haven't procurement dollars been requested in FY 1996?

Gen. O'Neill: The THAAD System is currently in the Demonstration and Validation Phase of the acquisition process. The purpose of this phase is to demonstrate capability and validate designs. For THAAD this phase started in Sep 92 and will end in Oct 96. The THAAD program has successfully completed a period of designing, intensive ground testing and fabrication of hardware, and has successfully initiated Dem/Val flight test on 21 April 1995. In accordance with the purpose of the Dem/Val phase, the THAAD design continues to be strenuously tested to identify and resolve technical issues. The results of such extensive testing has facilitated cost effective changes in the early stages of design and has mitigated risks traditionally addressed in later acquisition phases. Although we continue to aggressively search

for and resolve technical issues, the THAAD program remains on an accelerated pace and has advanced from a concept to flight hardware faster than any comparable missile interceptor program in history.

The THAAD program began its series of demonstration/validation flight tests at White Sands Missile Range, New Mexico on April 21, 1995. These flight tests are intended to verify the THAAD prototype concept, design and performance and gather data to support a Department decision on whether THAAD is ready to enter final design and manufacturing development. I am pleased to report that initial data reviews indicate the THAAD flight test achieved its intended test objectives. On this initial flight test, no attempt was made to engage a target. Engagements between the THAAD missile and representative theater missile targets will begin later this year. The THAAD program is in the research, development and test phase until FY99. Procurement funding will be requested for Low Rate Initial Production beginning in that fiscal year.

Mr. Hunter: General O'Neill and General Black, what is the program acquisition cost for THAAD? How many THAAD batteries will this procure? Is this enough to cover two major regional contingencies?

Gen. O'Neill: The total acquisition (RDT&E, Procurement, MILCON) cost for the THAAD Program is $9.0B, in Then Year (TY) dollars, and the cost for TMD-GBR is $3.9B, which totals to $12.9B in TY dollars for the THAAD System. This will procure eight THAAD batteries (four per battalion). Several Cost and Operational Effectiveness Studies (including the ones conducted by OSD/PA&E and the Army at Milestone I in 1992) and the Bottom Up Review in 1993 have determined that eight THAAD batteries are enough to cover two major regional contingencies.

Mr. Hunter: General O'Neill and General Black, is the Department of Defense still planning to fund and field a User Operational Evaluation System (UOES) version of THAAD? When will this system be available for deployment? Is there funding in the FY 1996 budget request for procurement of THAAD UOES? If not, why not?

Gen. O'Neill: Plans are still underway to fund and deliver the THAAD UOES. The UOES system is presently scheduled to be available for deployment in 1997. The primary purpose of the THAAD UOES is as a prototype system to evaluate and to enhance the objective system design. Funding is available to execute the 40 missile option. The UOES battalion is a User Test and Evaluation Organization which is being established to support the development of the objective system and to provide a vehicle for contingency operations in the event of a national emergency. The current plan is to support this organization with RDT&E funding.

Mr. Hunter: General O'Neill and General Black, can we effectively test THAAD against realistic targets if all such testing is performed at the White Sands Missile Range? Are 14 flight tests sufficient to impart confidence in the system's capabilities?

Gen. O'Neill: During the Demonstration/Validation (DEM/VAL) phase of THAAD's development, all technical program objectives can be met at WSMR (particularly the most stressing low altitude intercepts). The Dem/Val flight test program has a large number of flights to ensure sufficient data to support the Milestone II decision and also to demonstrate a prototype capability (THAAD UOES) for use during a national emergency. The range support and flight schedule have been coordinated in advance. All OSD and Army test agencies have confirmed that 14 test flights in the Dem/Val phase are sufficient to validate simulations of THAAD's performance. The THAAD test schedule was developed after an extensive review of several candidate test ranges and is based on a prudent sequence of increasingly technically challenging flight tests. Each flight test scenario will be tested at least twice to maintain the comprehensive, robust character of the overall test program. The 14 flight tests will provide sufficient data to meet the Milestone II Exit Criteria. As the THAAD design matures during EMD, it will be tested against long range targets at test ranges other than WSMR. Additional test flights are scheduled in EMD to further characterize THAAD's performance before a production decision is made.

Mr. Hunter: General O'Neill and General Black, is the THAAD system being designed to permit use of data from space-based sensors such as Brilliant Eyes? If not, why not?

ANSWER: The THAAD system is being designed to use external sensors including space-based sensors. However, prior to completing the development and testing of the requisite software (beginning in 1997 after the completion of the DEM/VAL flight test program), the USD(A&T) will review whether this capability is compliant under the ABM Treaty.

BRILLIANT EYES SPACE-BASED SENSOR

Mr. Hunter: General O'Neill and General Hawley, do you agree that deployment of Brilliant Eyes would improve the performance of U.S. theater and national missile defenses? If so, then why has the schedule been delayed?

Gen. O'Neill: Absolutely, the deployment of the Space and Missile Tracking System (SMTS, formerly Brilliant Eyes) is critical to the performance of the NMD objective architecture. The NMD system must have space-based midcourse tracking of targets from SMTS to provide a high-confidence, cost-effective defense of the United States. With regard to theater missile defense, SMTS' midcourse tracking capability will augment ground-based radars and extend the range of intercepts against the evolving, longer range theater ballistic missile threats. The SMTS will provide the added benefit of technical intelligence data gathering of national and theater ballistic missile infrared signatures during the midcourse flight phase necessary to adequately characterize the threat.

The launch of the SMTS Flight Demonstration System (FDS) has experienced only minor delays from early FY1998 to late FY1998 due to budget reductions by the Bottom-up Review and Program Decision Memorandum in early FY1994. The main impact of these reductions was to force a restructuring of the SMTS contracts such that only one of the two contractors would build, launch, and operate FDS satellites. The delay in restructuring the contracts caused by the Congressional mandate to integrate all DoD non-imaging space-based infrared systems and the resulting Space-Based Infrared System (SBIRS) architecture study last year has eliminated nearly all the schedule margin. However, the SMTS program is still aiming for a late FY1998 launch date for the FDS satellites. According to the integrated SBIRS deployment schedule, a deployment decision for SMTS will be made in the year 2000. If the decision is made to deploy SMTS, the first operational satellites will be launched in 2006. However, in the event of an earlier NMD deployment decision, the SMTS deployment will be accelerated appropriately.

PATRIOT ADVANCED CAPABILITY 3 (PAC-3)

Mr. Hunter: General O'Neill and General Black, the General Accounting Office has reported the number of PAC-3 interceptors to be procured may exceed the requirement. How many PAC-3 interceptors does BMDO plan to procure, and is that number under review? What is the program acquisition cost for PAC-3?

Gen. O'Neill: The Ballistic Missile Defense Organization (BMDO) plans to procure 1,200 PAC-3 missiles. BMDO is reviewing the number of PAC-3 missiles required as part of an analysis being conducted by the Theater Missile Defense Cost and Operational Effectiveness Analysis (COEA). The COEA study includes analysis of the number of missiles required by PATRIOT, as well as the other TMD systems. If warranted, after review of the COEA recommendations, BMDO would consider changes to the planned production quantities at future production milestone decision points. The COEA is slated for completion near the end of 1996. Total procurement costs for the PAC-3 missile is $2.3B in FY88 dollars.

Mr. Hunter: General O'Neill and General Black, what is the status of on-going risk mitigation activities on the multi-mode missile? How much has been requested for this activity in FY1996? How important is this risk mitigation activity and what are the technical objectives of this effort?

Gen. O'Neill: For clarification purposes, there is no "Multimode Missile" for which we are performing risk mitigation. The PAC-3 Risk Mitigation program is a phased approach for reducing risk with the PAC-3 (formerly ERINT) Missile. One of the planned risk mitigation activities involves the Multimode seeker. This effort is specifically tied to the performance of the PAC-3 missile. Efforts have started on the PAC-3 Risk Mitigation program. The Multimode

portion of the effort includes evaluation of an engineering model of the Multimode seeker. This phased effort could include hardware-in-the-loop and captive carry testing of the Multimode seeker, if warranted. In FY1996, the overall PAC-3 Risk Mitigation program request is $19.5 million. The risk mitigation funds will be used to continue efforts associated with the PAC-3 missile and development of the Flight Mission Simulator to accommodate the PAC-3 missile. There are no specific funds in the FY1996 request to continue the Multimode seeker effort. We are spending $7.5 million in FY1995 on testing the engineering model of the Multimode seeker and may redistribute additional funds to this effort, if warranted, to reduce overall PAC-3 program risk. The overall Risk Mitigation program is important to the PATRIOT program. It is a collection of specific tasks designed to address elements derived from a total risk assessment of the program. The program includes the captive carry testing of the PAC-3 seeker, upgrades to the Flight Mission Simulator, and parallel development efforts of selected high risk components in addition to the Multimode effort.

FUNDING FOR SPACE BASED MISSILE DEFENSE SYSTEMS

Mr. Hunter: General O'Neill, why did the Department terminate work on Brilliant Pebbles? Were there technical or management or cost problems in the program that led to this decision? How much funding in FY1996 has BMDO requested to continue research on space-based kinetic kill interceptors?

Gen. O'Neill: The Brilliant Pebbles was a major program leading to the development and deployment of kinetic energy space-based interceptors. The program had passed milestone I and would have started deploying its initial constellation in 1995 had the program remained fully funded. However, in 1992, about a year into the pre-EMD phase, it became clear from the FY1993 Congressional Budget hearings that serious concerns existed regarding what was perceived as SDIO's overly aggressive pursuit of the Brilliant Pebbles program. Brilliant Pebbles funding was characterized as "dominant," going well beyond the "robust" mandate of the Missile Defense Act (MDA), and the Brilliant Pebbles schedule was thought to put the program well out in the front of other Global Protection Against Limited Strikes (GPALS) elements that, unlike Brilliant Pebbles, were included in the initial deployment architecture. The sense of key members of Congress was that Brilliant Pebbles should be considered a follow-on technology program which needed to be slowed and brought into better fiscal alignment with the rest of the GPALS elements. Accordingly, Congress appropriated only about half of SDIO's FY1993 request for Brilliant Pebbles. Consequently, the Department of Defense made the decision to downscope, then terminate Brilliant Pebbles as part of the overall defense reduction. No technical or management issues would have prevented the program from continuing on its original schedule: funding reductions prevented Brilliant Pebbles from achieving a successful demonstration test, either for missile target intercept or data collection for interceptor guidance improvements.

Currently, BMDO has not budgeted for Brilliant Pebbles or any space-based kinetic kill interceptor work. The Brilliant Pebbles contracts are proceeding toward termination and disposition of hardware, which should be completed within one year. However, contained within the Enhanced Technology NMD excursion (Excursion III), if funded, would include $50M per year, for a space-based interceptor Technology Readiness Program.

Mr. Hunter: The Clinton Administration has slashed funding for various space-based missile defense programs. Work on space-based interceptors concepts, including Brilliant Pebbles, has been terminated despite the potential such systems hold for effective defense against longer-range missiles. Why has funding for other promising space-based systems been reduced? Is there a bias within the Department against space-based missile defense systems?

Gen. O'Neill: Space-based interceptors, such as Brilliant Pebbles, have strong potential as ballistic missile defense weapons. For instance, space-based interceptors offer intercept opportunities outside the atmosphere against strategic-class and some longer-range theater-class ballistic missiles. A layered defense which incorporates both space- and ground-based defensive systems would be highly effective since it would offer multiple intercept opportunities and allow space-based weapons to engage missiles early in flight -- before they could deploy reentry vehicles or penetration aids. Despite such strong potential as a defensive weapon, space-based weapons like Brilliant Pebbles face ABM Treaty complications. The ABM Treaty prohibits the development, testing and deployment of space-based weapons. In addition to treaty

considerations, the space-based interceptor and Brilliant Pebbles programs have consistently faced funding limitations from the Congress. For instance, as early as Fiscal Year 1988 the Congress established funding ceilings for space-based interceptor research and prohibited the use of funds to carry out full-scale engineering development or deployment activities for SBI. More recently, during consideration of the Fiscal Year 1994 National Defense Authorization Bill, the House specified that no funds would be available for the Brilliant Pebbles program. In the end, the Congress authorized a ceiling of $35 million for Brilliant Pebbles in Fiscal Year 1994 -- below the authorized and appropriated level in Fiscal Year 1988 and well-below that needed to sustain a meaningful technology program.

Under the Department's Bottom-Up Review, priority was placed first on Theater Missile Defense, followed by National Missile Defense second, and Technology third. The Brilliant Pebbles program was not deemed a candidate for either a TMD system or an ABM-Treaty compliant, ground-based NMD system. Brilliant Pebbles became an advanced technology program with a focus on expanding the technology base for kinetic energy weapon systems. The program was transferred to BMDO's Other Follow-on Technology budget line, where it competed with other technologies for very limited resources.

There is not a bias within the Department against space-based missile defense systems. Funding reductions for space-based systems such as Space & Missile Tracking System (formerly named Brilliant Eyes) and Space-based Chemical Laser (SBL) are related to limited resources available for space-based infrared surveillance systems and advanced BMD technologies. During the last few years Congress combined funding for early warning systems and directed the Department to study the space-based infrared systems (SBIRS) architecture. During the Summer and Fall of 1994, the Department's SBIRS architecture study team reviewed infrared requirements and programs to meet future infrared satellite needs. SBIRS optimizes satellite platforms at different altitudes to address the mission requirements in four areas: missile defense, missile warning, technical intelligence, and battlespace characterization. The Department approved a high-altitude now, low-altitude later approach to an integrated architecture and transferred management and future years defense program funding for BMDO's Space & Missile Tracking System to the Air Force. Following the Department's Bottom Up Review, BMD programs were reduced by an additional $1.1 billion. This translated into a funding reduction to several programs, including SMTS.

The space-based chemical laser program is funded in BMDO's Technology budget line. Under the Bottom-Up Review, this element of the BMD program is the third priority, relative to TMD and NMD efforts, and is funding-constrained. As such, space-based chemical laser competes with other programs within a BMD technology budget of about $180 million per year. The Administration's Fiscal Year 1995 budget request for space-based chemical laser and acquisition, tracking and pointing (ATP) research totalled $90 million. The Congress authorized and appropriated only $30 million and less than $10 million for ATP, and authorized that these funds be used to complete the integration of the Alpha Laser, LAMP optics, and LODE beam control. The Authorization conferees noted that they "intend that the space-based portion of the chemical laser program end upon completion of the Alpha LAMP integration."

AIR FORCE BOOST PHASE INTERCEPT AND AIRBORNE LASER PROGRAMS

Mr. Hunter: General O'Neill and General Hawley, what is the status of the Boost Phase Intercept (BPI) program? What has been requested in the FY1996 budget for BPI?

Gen. O'Neill: The kinetic energy Boost Phase Intercept program has been making progress toward demonstrating the feasibility of an airborne interceptor weapon system to kill theater ballistic missiles in their boost phase. The status of the kinetic energy Boost Phase Intercept (BPI) program is as follows: The Air Force continued work on the kinetic kill vehicle technology through the Army's Atmospheric Interceptor Technology (AIT) program. The AIT program has developed detailed seeker designs and preliminary kill vehicle designs have been completed. This work addresses critical seeker window thermal and optical issues. Seeker forebody and window hardware for aero-optical testing at the Large Energy National Shock tunnel have been fabricated and will be tested in the 3rd and 4th quarters of this fiscal year. Prototype seeker component and subsystem hardware is being fabricated for bench level testing. A downselect to one contractor in FY1996 is on schedule. Test firing of an Advanced Solid Axial Stage rocket motor has been completed with a scaled-up design planned for BPI.

Concept of operations studies are being performed jointly by the Air Force and the Navy to analyze force structure, timelines, and intelligence preparation of the battlefield issues. Definition of aircraft modification and off-board sensor requirements has been initiated to identify issues associated with missile/ aircraft integration and Battle Management, Command, Control and Communications (BMC3).

BMDO funding in the amount of $49.061 million has been requested in the FY1996 budget for BPI. In FY1996 kinetic kill vehicle technology and ground tests on the two competing designs will be conducted, leading to a downselect to one contractor. The Air Force will begin advance integration work on a missile design. Additional work will be done to understand lethality, aircraft integration, and to refine the joint Air Force-Navy CONOPS.

Mr. Hunter: General O'Neill and General Hawley, what is the status of the Airborne Laser (ABL) program? How much has been requested by BMDO and/or the Air Force in the FY1996 budget for ABL?

Gen. O'Neill: The Airborne Laser program is proceeding on schedule and within budget. The program is 11 months into a 33-month competitive concept design effort between two industry teams: (1) Boeing/Lockheed Martin/TRW and (2) Rockwell/Hughes/E-Systems. In 1996 and 1997, the contractors will provide detailed designs for the ABL Demonstrator that is directly scalable and traceable to the Full Operational Capability (FOC) ABL system. The Air Force assesses risk as low to moderate for completion of the concept design effort in 1997. The winning concept design will be carried into a lethality demonstration against boosting theater ballistic missiles in CY2001. Concurrently, a government Technology Insertion Program is investigating the areas of atmospheric propagation, laser efficiency, and lethality with several key experiments already completed and underway. Results of these experiments will be used by the competing contractor teams to optimize their ABL designs.

The BMDO FY1996 budget request for Directed Energy (DE) programs contains $30M allocated to Space Based Lasers (SBLs) only, with no allocations to ABL. In FY1992, in agreement with the Air Force, BMDO (then SDIO) transferred the ABL program to the Air Force along with approximately $400M in out-year budget authority. This was done at the urging of Congress under instructions to DoD to transfer to the services or ARPA (then DARPA) "immature" programs that could not result in fielded systems within 15 years. The Air Force has requested $20 million (PE63319) in FY1996 for the ABL concept design effort, and $8.5 million for the technology insertion program. In FY1995, BMDO provided $9.1 million to continue development of tracking and pointing technologies common to Airborne and Space-Based Lasers.

Mr. Hunter: General O'Neill and General Hawley, what are the primary technical challenges associated with Boost Phase Intercept? With Airborne Laser? How promising are these concepts and what will it cost to bring them to fruition?

Gen. O'Neill: Kinetic energy Boost Phase Intercept (BPI) builds on 30 years of tactical missile experience as well as kinetic kill vehicle technology. In air-to-air missiles, the Air Force and Navy fielded such tactical missiles as Sidewinder, Sparrow, HARM, Phoenix, and AMRAAM. Also, the Department has three decades of hypersonic vehicles legacy in both exo- and endo-KKV technology, to include Space-Based Interceptor, Brilliant Pebbles, LEAP, and ENDO-LEAP kinetic kill vehicle technology. Kinetic energy BPI is a natural extension of air-to-air technology. The challenges associated with kinetic energy BPI have to deal with the development of the kill vehicle, missile integration, aircraft integration, surveillance and command/control integration, and the evolution of a robust concept of operations. The kill vehicle is required to destroy the boosting theater ballistic missile target through a hit-to-kill intercept. The seeker must have the capability to acquire the target, separate the target's hardbody signature from its rocket plume, and provide sufficiently accurate guidance commands to intercept the target at the selected aimpoint. To perform this intercept, the kill vehicle must have a very fast control response time that can only be achieved through use of a propulsive divert and attitude control system. In addition, the kill vehicle must be thermally protected to survive the harsh environment of hypersonic flight within the atmosphere. Both kill vehicle concepts being developed within the Atmospheric Interceptor Technology (AIT) program for BPI possess all of these features. The significant investment made in the AIT program over the past four years demonstrates that these kill vehicle concepts may be viable with acceptable risks of their successful development, and the promise of achieving an effective kinetic energy BPI capability is potentially high.

In evolving a robust concept of operations, the major challenges are associated with the short timelines in which sensors must acquire the boosting target and communicate firing orders accurately through the command and control system. Studies are underway to develop these operational concepts within the framework of existing air defense systems and doctrine. Initial results indicate that the short timelines, while challenging, are achievable and that this BPI concept has much promise. In fact, the Air Force Scientific Advisory Board determined that kinetic energy BPI interception of TBMs is much less stressing than the ASAT program on launch timelines and the launch stress should be considerably less than that of a long range head-on AMRAAM launch. However, if the advanced submunitions threat intensifies, a more robust program will be required to field a combat capability sooner. The total cost for the technology concept demonstration is estimated at $515 million.

The primary technical challenges associated with Airborne Laser (ABL) are: (1) ability to compensate for atmospheric turbulence and propagate a lethal beam from a high-power laser to militarily significant ranges, (2) ability to track the booster and precisely point and maintain the high-power beam on the desired aimpoint, and (3) ability to package and integrate the technology components into a reliable airborne weapon system. To mitigate risk in the first challenge area, an affordable technology program was established in FY1992. Results to date are encouraging and support underlying ABL design assumptions. The program has been reviewed at a detailed technical level twice by the Air Force Scientific Advisory Board and four times by an ABL Independent Review Team. Both groups have endorsed the program as achievable and within the state-of-the-art of existing technology. Similarly, in the second area, a series of experiments are being conducted which will mitigate risk. The BMDO directed energy program will acquire, illuminate, and track boosting missiles using the payload of the High Altitude Balloon Experiment in ground tests at White Sands Missile Range (WSMR). Using the Sea Light Beam Director (SLBD), the ABL program will also actively track targets of opportunity launched from WSMR. Finally, the high bandwidth tracking needed for pointing through turbulence will be tested, first at the MIT Lincoln Lab's firepond facility, and then at WSMR using the SLBD. To address the third challenge area, two contractor teams are conducting detailed concept design reviews to address the operational concept, integration of the subsystems into a militarily useful aircraft, supportability, and other significant design issues for the fully operational ABL. Each contractor team's demonstrator and operational design will be modeled in the Theater Air Command and Control Simulation Facility (TACCSF) to assess operational utility. Final technical validation of the ABL concept is via a high-power demonstrator which will have significant residual operational capability. The funding required to complete the demonstrator is $670 million.

NAVY UPPER TIER

Mr. Hunter: General O'Neill, why is the Navy Upper Tier program no longer considered a "core" TMD program?

Gen. O'Neill: I support the Bottom-up Review (BUR) and Defense Planning Guidance direction on TMD systems. Unfortunately, funding is not available to support all the potential theater ballistic missile defense systems. We continue to evaluate critical operational requirements with regard to emerging threats, cost, schedule, performance, and the technology maturity of each proposed system.

Of the systems identified in the BUR and Defense Planning Guidance, Patriot Advanced Capabilities (PAC-3), Theater High Altitude Area Defense (THAAD), Navy Lower Tier (Sea-based Area TBMD) and Battle Management Command, Control and Communications (BMC3) were and remain the core major acquisition programs. A one billion dollar budget reduction subsequent to the BUR forced BMDO to reconsider funding priorities. This compelled BMDO not to fund Navy Upper Tier as an acquisition program starting in FY95. Our current strategy does not contradict the BUR or Defense Planning Guidance. It represents our best effort to adhere to the intent of these documents in a challenging fiscal environment.

Our current investment strategy should in no way be construed as a lessening of our commitment to Navy Upper Tier. We remain dedicated to evolving this capability in preparation for an FY98 decision to transition to a full acquisition program.

Mr. Hunter: General O'Neill, by how much has the funding for Navy Upper Tier been cut by the Department since the BUR was completed? Why where these cuts made?

Gen. O'Neill: ($ in thousands)

	FY95-99
BUR (Sept 93)	$1,357,409
FY 96PB (Jan 95)	$ 325,492*
Total Reduction FY94-99	$1,031,917

The $1.1 billion post-BUR reduction to the BMDO program forced BMDO to revisit the BUR recommendation to consider two new starts during the period FY 1995 - 1999. It was originally planned that the Navy Upper Tier program would be started in FY 1995. The $1.1 billion reduction, coupled with the emergence of the Boost Phase Intercept program that was not considered during the development of the BUR, forced BMDO to postpone the decision to consider starting Navy Upper Tier as an acquisition program until FY 1998.

*Assumes selection as the next Advanced Capabilities DEM/VAL program in 1998.

Mr. Hunter: General O'Neill, if additional funds were provided in FY 1996 for Navy Upper Tier, how might the program be accelerated?

Gen. O'Neill: An additional $150M would enable us to accelerate critical missile flight tests. Funding would also be applied to risk reduction activities such as technology demonstrations geared toward a deployable system.

Mr. Hunter: Admiral Hood, do you agree with General O'Neill's assessment?

Adm. Hood: Yes, increased risk reduction activity such as flight tests would accelerate the Theater Wide program.

Mr. Hunter: Admiral Hood, what is the status of the on-going COEA on Navy Upper Tier? When will it be completed?

Adm. Hood: The Navy TMD Cost and Operational Effectiveness Analysis (COEA), was initiated in October 94 and is expected to complete in early FY96.

Mr. Hunter: Admiral Hood, what steps have been taken to ensure that alternatives to the Navy LEAP, such as a high acceleration, "marinized" version of THAAD are considered? Do you agree on the need for a "level playing field" in this study, especially in light of the LEAP test failure a few days ago? Are you assuming in the COEA the availability of data derived from space-based sensors such as Brilliant Eyes? If not, why not?

Adm. Hood: The COEA process is designed to ensure that we look at the technical and operational requirements in the context of military worth and cost. Specifically, the COEA will examine interceptor missile options without optimizing the specific details but will at the same time identify the technical risks associated with each missile. We have established an oversight board, comprised of senior military officers and civilians that meet on a regular basis to review COEA progress, including ensuring objectivity. Further, the COEA team has access to all missile manufacturers and laboratory people to ensure that all inputs are considered. I believe we are conducting an objective COEA.

Even though neither of the two recent LEAP flight tests resulted in an intercept, the data from the results of the tests indicate the flights were very successful from the stand point of objectives achieved. What we would like to do from here is continue risk reduction flight tests, moving to an AEGIS ship and STANDARD Missile Block IV, to help us further evaluate this promising LEAP concept with other Navy Theater Wide alternative interceptor concepts.

The contribution of space based sensors is being considered in the COEA.

Mr. Hunter: Admiral Hood, what happened in the recent LEAP test failure? When will the next LEAP test be conducted? If that results in a test failure as well, will the Navy abandon the LEAP concept?

Adm. Hood: During the LEAP firing on March 4, all of the LEAP technology components performed well. However, an anomalous flight path of the second stage of the Terrier Missile caused by a computer program problem in the missile guidance computer prevented target intercept. Although the subsequent LEAP firing on March 28 did not produce a target intercept, the event yielded valuable results and data that have led us to believe that the LEAP concept is feasible; and we are planning to continue flight tests.

Mr. Hunter: Admiral Hood, does Navy Upper Tier need an external sensor such as Brilliant Eyes to perform its mission? Why or why not?

Adm. Hood: The Navy Theater Wide (Upper Tier) approach is designed to have an autonomous capability and therefore does not need an external sensor to perform its mission. However, external sensors could significantly enhance the performance of the BMDO developed TBMD systems.

Mr. Hunter: General O'Neill, do you agree with Admiral Hood's Assessment?

Gen. O'Neill: Yes.

NAVY LOWER TIER

Mr. Hunter: Admiral Hood, and General O'Neill, what is the status of the Lower Tier effort? How much funding has been requested in FY 1996 for Lower Tier? What was the impact of funding reductions imposed by the Congress in FY 1995?

ANSWER: The combination of a funding reduction in FY95 of $40M and delays in the Navy's Standard Missile Program have contributed to delays in the Lower Tier program. We now plan on fielding the User Operational Evaluation System (UOES) in 1998 rather than the planned 1997. First Unit Equipped (FUE) will move to late 2000 rather than 1999. The Cost and Operational Effectiveness Analysis (COEA), which is being done in coordination with the Joint TMD COEA, is in progress to support a MS IV Defense Acquisition Board (DAB) decision in FY96. Based on the maturity of this program, we anticipate that the DAB will allow the Lower Tier program to enter Engineering and Manufacturing Development.

Mr. Hunter: Admiral Hood, will the Navy's Lower Tier system have anti-tactical ballistic missile, anti-cruise missile, and anti-aircraft capability?

Adm. Hood: Yes, the AEGIS Weapon System modifications for the Navy Area TBMD program support STANDARD Missile (SM) 2 Block IVA engagements against tactical ballistic missiles, anti-ship cruise missiles and aircraft. The SM-2 Block IVA, including its blast fragmentation warhead, was specifically designed as a common missile to be effective against all of these targets.

Mr. Hunter: Admiral Hood and General O'Neill, is the Navy still planning to initially deploy a blast fragmentation warhead on the Lower Tier system? Does the Navy plan to incorporate a hit-to-kill warhead on the Lower Tier system in the future, which might give it better capability against chemical submunitions? Please explain the Navy's strategy.

Adm. Hood: Selection of a Navy Area TBMD interceptor design strategy is driven by operational requirements. The Navy has no TBM intercept capability today. Evolution of the STANDARD Missile provides the quickest path to the introduction of TBM capability in the fleet. Navy lethality testing has shown that the fragmenting warhead design for STANDARD Missile (SM-2) Block IVA is fully capable against unitary high explosive and bulk chemical warheads in current TBMs. Cruise missiles are especially stressing to the Navy and the capability to defeat these threats must be retained.

These factors (urgent operational requirement, retention of cruise missile capability, and complex threat spectrum) have driven the Navy approach to continue with evolution of the STANDARD Missile to provide the earliest TBMD capability, while maintaining anti-ship cruise missile capability. An interceptor using imaging infrared (IIR) guidance and a fragmenting warhead provides the increased capability needed to counter TBMs and cruise missiles in the multi-threat and multi-mission environments where Naval ships must operate. IIR guidance was selected due to the relative insensitivity to countermeasures. Recent performance analysis indicates that the initial SM-2 Block IVA design will result in a high percentage of direct hits as well as very robust lethality with a fragmenting warhead, including good capability against submunitions.

As submunition threats and other weapons of mass destruction emerge and proliferate, the Navy will continue to pace these threats by enhancing SM-2 Block IVA performance. Pre-planned Product Improvement (P3I) efforts will improve guidance accuracy, aim point selection, missile responsiveness and maneuverability, and warhead effectiveness. This will increase the percentage of direct hits while maintaining the robust lethality of both direct hit guidance and a blast-fragmentation warhead.

Mr. Hunter: Admiral Hood, what is the schedule for conducting tests that will "prove out" the feasibility of the Lower Tier concept? What is the relationship between these tests and a Milestone IV production decision?

Adm. Hood: There are several risk reduction activities planned before the Milestone IV Defense Acquisition Board next fall. For the AEGIS Weapons System, we plan to conduct a tracking experiment early this summer aboard two AEGIS cruisers. Later this summer we will begin a series of flight tests at White Sands Missile Range (WSMR) to demonstrate the improved guidance of the Imaging Infra-Red Seeker the SM-2 Block IVA. These tests and a STANDARD Missile preliminary design package along with lethality test and data analysis will provide the data to support a Milestone IV decision to enter the Engineering and Manufacturing phase of acquisition (the MSIV is not a production decision).

Mr. Hunter: Admiral Hood, how will the Combined Engagement Capability (CEC) command and control and intelligence internetting capability impact the performance of Navy missile defense systems?

Adm. Hood: First of all, CEC is a weapons control data link that supplements the various command and control and intelligence internetting system capabilities. Through sensor integration, CEC will create earlier opportunities to engage targets and contribute to the effective use of surveillance assets for TBMD and other mission areas, to more efficient use of weapons and reduced potential blue-on-blue situations. The performance enhancements have been shown also to be applicable in the Joint environment including the littoral.

COOPERATIVE MISSILE DEFENSE ACTIVITIES

Mr. Hunter: General O'Neill, what is the status of the Arrow Program? How much funding has been expended on this project to date and how much is included in the FY 1996 budget request for Arrow?

Gen. O'Neill: The Arrow program has been conducted in two phases to date, with a third phase being initiated. The first phase was the Arrow Experiments Program, conducted during 1988-1992, that developed and tested a pre-prototype anti-tactical missile interceptor. Phase two was known as the Arrow Continuation Experiments (ACES) and began in 1991. This program was focused on validating kill mechanisms and developing and flight testing the tactical prototype Arrow interceptor. Flight testing on the prototype interceptor is set to begin this summer and will continue over the next eighteen months. The third phase is the Arrow Deployability Program (ADP) to conduct weapon system level integration and flight tests to address the issues involved in deploying a theater missile defense system. The total program cost for the Arrow/ACES program from FY88-95 is approximately $400M (~ $50M/yr. avg.).

The Arrow/ACES efforts have been conducted under two contracts with Israel Aircraft Industries, Ltd. The Arrow Experiments contract had a value of $158M, of which the U.S. paid 80%, or $126.4M, with the Government of Israel paying the remainder. The ACES Contract is valued at $330M, of which the U.S. will pay 72%, or $238M, with the Israelis paying the remainder. The ADP is currently under negotiation with the Government of Israel and scope, funding levels and cost shares have not yet been determined.

Mr. Hunter: General O'Neill and General Black, has the United States derived useful technological information from the Arrow development program? If so, please describe.

Gen. O'Neill: The U.S. technical benefits from the Arrow/ACES come from providing alternative technologies as risk reduction to U.S. TMD programs. Arrow uses the identical focal plane array, manufactured by the same U.S. vendors as those of THAAD. Arrow uses the same focal plane array materials as the Navy Standard Missile II Block IV A (SM-2 Block IV A). Arrow has obtained the only flight data currently available for one of those focal plane arrays. The data have been provided to THAAD and the SM-2 Block IV A programs. Other benefits for

the U.S. TMD development programs include risk reduction data on hypersonic missile flight; lethality and kill assessment; target signatures for infrared and radio-frequency seekers; infrared signature prediction codes; booster stage separation at high velocities and dynamic pressure; and hypersonic flight performance of radomes in the endo-atmosphere.

It is in the U.S. national interest to support the development and deployment of the Arrow Missile System in order to provide for a robust missile defense capability in Israel. This system will contribute to the deterrence of future TBM conflicts in that region and has the potential to contribute to a more robust defensive response if deterrence fails. The potential interoperability of the Arrow System with U.S. systems would facilitate effective coordinated defense with U.S. systems deployed to the Middle East theater. Redundant systems in a shared theater of operations would improve defense synergistically and reduce the costs of a single-system defense.

Mr. Hunter: General O'Neill, has the United States committed to help fund the deployment of Arrow? What is entailed in deploying this system, and how much will it cost?

Gen. O'Neill: The Arrow Weapon System entered the equivalent of the U.S. EMD stage of development in the summer of 1994. The U.S. is currently discussing with the Government of Israel a follow-on program to assist Israel in addressing a number of issues involved in integrating and fielding an anti-tactical missile defense system. This program has been authorized by Congress and is known as the Arrow Deployability Program. This program will center around the system level integration and flight testing of the components of the Arrow Weapon System, including the interceptor missile and launcher cooperatively developed by the two countries and the fire control radar and battle management center, unilaterally developed by Israel. During this program, the U.S. will help investigate some of the fundamental elements of an effective weapon system, such as battle management, lethality, kill assessment and producibility. Additionally, efforts will be undertaken to examine interoperability options and requirements to enable U.S. TMD systems such as PAC-3, THAAD, and Navy Lower Tier to work in coalition with Israel in future military scenarios.

The U.S. is specifically not involved in production of operational Arrow missiles or other weapon system elements, nor will it be involved technically or financially in fielding or operating the Arrow Weapon System. The U.S. involvement is limited to research and development activities only. Therefore, the U.S. has limited visibility into Israel's projected costs for deployment of the system and also limited official insight into deployment sites or defense concepts.

A classified estimate of Arrow Weapon System cost prepared to Department of Defense standards was provided by BMDO to the Congress in the April 1, 1994, Arrow System Report to Congress.

Mr. Hunter: General O'Neill, what is the status of U.S./Israeli boost phase intercept programs? Does the FY1996 budget request include funds for any joint programs on BPI? What are the technical merits, or drawbacks, associated with the Israeli concept?

Gen. O'Neill: BMDO recently awarded a contract with an Israeli firm (WALES, LTD.) to determine the benefits of the Israeli Boost Phase Intercept System (IBIS) concept to the United States. Plans are to utilize simulations and wargaming to establish the effectiveness of the Israeli concept under several scenarios. Simulation results quantifying the technical merits and drawbacks will be available in late CY1995.

The FY1996 budget request at present has no funds allocated to a joint U.S./Israeli BPI program.

The IBIS concept can be utilized as the first tier of a multi-layered defensive system and can be used as a deterrent to the initial use of theater ballistic missiles by an enemy and mitigates the possible saturation of terminal defenses. A drawback is that it must, because of the interceptor range, over fly enemy territory. The concept appears to have potential as a near-term boost phase intercept system using existing technology and will certainly provide a pathfinder and risk mitigation for the U.S. boost phase intercept.

Mr. Hunter: General O'Neill, when will Japan make a formal decision on the deployment of a missile defense system?

Gen. O'Neill: The Government of Japan (GOJ) hopes to make a formal policy decision regarding acquisition and deployment of a missile defense system in the next two to three years.

Mr. Hunter: General O'Neill, what is the status of U.S.-Japan talks on missile defense cooperation? Is Japan interested in purchasing U.S. TMD systems? If so, which ones?

Gen. O'Neill: The United States and Japan have conducted discussions regarding Theater Missile Defense (TMD) since December 1993, when the first meeting of the U.S.-Japan TMD Working Group was held at Camp Smith, Hawaii. This TMD Working Group, which is subordinated to the U.S.-Japan Security Subcommittee (SSC), has met on three occasions over the last sixteen months.

The Government of Japan must first make a political decision regarding TMD before it formulates a policy regarding the design or acquisition of a TMD capability. The Japanese Defense Agency (JDA) and BMDO, at the direction of the TMD Working Group mentioned above, are in the process of beginning a Bilateral Study on Ballistic Missile Defense, which will last for two to three years. The study is intended to develop information which will allow the GOJ to make an informed decision on whether or not to introduce a ballistic missile defense capability. This is primarily a Japanese study: while the U.S. will provide information and analytical support, the GOJ will perform most of the study. During the course of this study, Japan will consider the utility and adaptability to their particular national requirements of the full range of U.S. TMD systems under development.

Mr. Hunter: General O'Neill and General Black, what is the objective of the MEADS program? Does this effort take the place of the old Corps Surface-to-air missile (Corps SAM)?

Gen. O'Neill: The objective of the MEADS program is to provide a weapon system that meets the military requirements of the four nations involved in this cooperative program--United States, France, Germany, and Italy. In the U.S., this system will satisfy the operational requirements for a Corps Area Air/Missile Defense capability that will provide protection to the maneuver forces from attack by both ballistic missiles and cruise missiles. There is no other program to satisfy these requirements. As such, it will take the place of the Corps SAM program.

Mr. Hunter: General O'Neill and General Black, how much funding is requested in the FY 1996 budget for MEADS/Corps SAM? What is the schedule for this effort?

Gen. O'Neill: The FY 1996 budget request is $30.442M. The FY 1996 funding is required to initiate the contractual effort by two competing international teams to conduct Project Definition-Validation (PD-V). Once the proposals are received from industry, we will have a better understanding of the FY 1996 requirement. The estimates currently being reviewed by the Army are based upon a 50% share of the contractual effort that is required to complete PD-V in 1998. Beyond PD-V, the schedule and funding will be estimated to provide an in-service date for the system of 2005 as stated in the SOI.

Mr. Hunter: General Black, how important is the Corps SAM/MEADS to the Army's mission? Why isn't the Army funding this effort instead of BMDO?

Gen. Black: The MEADS program is exceptionally important to the Army mission in that it will provide protection to the maneuver forces at two very critical phases of operation. First, we will be able to protect our forces during entry into the theater of operation when they are highly vulnerable. MEADS will be transportable by C-130 for deployment where only tactical airfields are available and will be transportable by naval landing craft for over-the-shore deployment by the USMC. Second, MEADS will be capable of moving with the maneuver force as they go forward to engage in the decisive operations with the enemy force. Protection of critical logistic, command and control, and troop assets during this phase is critical. This will allow our forces to win quickly and minimize casualties.

The Army had funding in the FYDP for Corps SAM when the Army approved Corps SAM for concept definition. Based upon Congressional direction to OSD to provide centralized management of TMD related systems, OSD transferred the Corps SAM program and the associated funding to SDIO. Since that time SDIO/BMDO had been responsible for funding Corps SAM.

FOLLOW-ON/ADVANCED TECHNOLOGY PROGRAMS

Mr. Hunter: The budget for follow-on/advanced technology R&D has declined precipitously in the past several years. These activities are the "seed corn" of the future which prevents technological surprise and counters threat advances by potential adversaries. General O'Neill, how much funding is included in the FY1996 budget request for follow-on/advanced technologies? In your personal opinion, is this amount adequate to the task of preserving a robust technology base for the future?

Gen. O'Neill: BMDO has budgeted $172.7 million in FY1996 for advanced technology development. Of this amount, $42.6 million is for the congressionally mandated Small Business Innovative Research program and $50.7 million is in the exploratory development category (6.2) for BMDO's highly regarded Innovative Science and Technology program, leaving only $79.4 million for BMDO's advanced technology (6.3) programs. Advanced technology has been inadequately funded for the past two years (FY1994 and FY1995), and the advanced technology budget for FY1996 continues the trend. Nearly all advanced sensor and interceptor technology has been consolidated into two programs: the Advanced Sensor Technology program and the Discriminating Interceptor and Systems Technology program. The directed energy (DE) program comprises the other major piece of the 6.3 program. In recent years it has been reduced from a level of more than $200M to less than $50M in the FY1996 President's Budget Request. Many essential advanced technology programs have been terminated and the remaining ones have been sharply curtailed. The impacts of today's very austere advanced technology budget will not be felt for several years but then will become critical. Technologies will not be in the pipeline for improving the components of current systems, or replacing them with new systems, when advanced threats appear or when mission mandates change. In the interim, the advanced technology budget will not have supported development or testing of new technologies or the adoption of innovative ideas from outside technology communities. At best, we will have to make use of inefficient technologies with resultant poorer system effectiveness. At worse, we may not be able to deal with new threats or support new missions. The other DoD components have their plates full simply satisfying the technology needs of their own existing missions. As a result, if BMDO cannot fund for advancing these technologies, they will not go forward.

Mr. Hunter: General Black, how would you characterize the amount of funding included in the FY1996 request for follow-on/advanced technology? What do you see as the highest priority follow-on/advanced technology activities for the Army?

Gen. Black: As General O'Neill has already testified, BMDO's advanced technology programs supporting Army TMD programs have been inadequately funded for FY1994 and FY1995. The FY1996 Budget Request curtailed the pursuit of the Innovative Science and Technology (IS&T) program and Small Business Innovative Research (SBIR) program applicable to the TMD core acquisition programs. I fully support General O'Neill's position in answer to a related question (BMDO Question 74) regarding allotment of any additional funds available to support improvements in our missile defense systems. The Army is fully committed to fielding their core systems first and the advanced concepts as quickly as funding and technology will allow.

Mr. Hunter: General O'Neill and General Black, how would you propose to spend any additional resources that might be made available in FY1996 for follow-on/advanced technology?

Gen. O'Neill: If the Congress were to increase BMDO's funding by about $1.2B this year, I would increase my spending on advanced technologies (Program Elements 0602173C and 0603173C, Support Technologies) by approximately $300 million. With this additional funding BMDO would be able to restore the directed energy program at a level of $150 million. BMDO would provide $150 million to support more rigorous research into surveillance and tracking sensors and kinetic energy weapons concepts and components. These additional investments in our technology base would enhance our ability to make improvements to our first generation defensive systems. These programs could be well-executed and would build on our strong acquisition programs, provide for focused advanced exploratory technologies, and develop new system concepts to meet future threats.

ARROW

Mr. Hunter: What is the current status of the Arrow program? How important is it to you to continue this kind of joint research?

Gen. O'Neill: The Arrow program has been conducted in two phases to date, with a third phase being initiated. The first phase was the Arrow Experiments Program, conducted during 1988-1992, that developed and tested a pre-prototype anti-tactical missile interceptor. Phase two was known as the Arrow Continuation Experiments (ACES) and began in 1991. This program was focused on validating kill mechanisms and developing and flight testing the tactical prototype Arrow interceptor. Flight testing on the prototype interceptor is set to begin this summer and will continue over the next eighteen months. The third phase is the Arrow Deployability Program (ADP) to conduct weapon system level integration and flight tests to address the issues involved in deploying an anti-ballistic missile defense system.

Additionally, the ACES program included three flight tests of the pre-prototype Arrow I missile, with the warhead developed for the tactical prototype Arrow II interceptor. These tests were to measure guidance and control effectiveness, warhead fuzing and lethality. These tests resulted in engagements where the missile acquired the surrogate tactical ballistic missile (TBM) with its on-board infrared sensor, homed on the target and achieved miss distances necessary for successful intercepts. On the last of these tests, against a surrogate TBM armed with a simulated unitary chemical payload, the interceptor acquired and homed in on the target, fuzed the warhead, and destroyed the target. The remainder of the ACES program will involve six flight tests of the Arrow II tactical prototype interceptor. The first two of these tests, both scheduled for this summer, are termed "integration tests" and will test propulsion and control systems and verify the performance in flight of all avionics and sensors. The following four tests will each involve engagements of TBMs at various ranges and altitudes. In summary, the Israelis are making good progress across the board on this program.

Mr. Hunter: Could you elaborate further on the benefits the U.S. has received from the Arrow program?

Gen. O'Neill: In short, the primary benefits are the demonstration of technology and improved manufacturing processes for key components important to U.S. TMD systems. Also, accumulation of real endoatmospheric flight data into the U.S. database will serve to reduce the investment and risks involved in future TMD developments in the U.S.

Mr. Hunter: What are the long term benefits of U.S. participation in the program? How will the Arrow benefit the United States research efforts toward developing a fully integrated Theater Missile Defense System?

Gen. O'Neill: The potential interoperability of the Arrow System with U.S. TMD systems would facilitate effective coordinated defense should U.S. forces be deployed to the Middle East theater. In addition to providing a more effective defense, interoperability may mitigate U.S. logistics requirements by reducing the number of U.S. systems required in a Middle East contingency operation.

Mr. Hunter: To what extent has the Arrow program proved useful in advancing our own THAAD missile system?

Gen. O'Neill: Arrow uses an identical focal plane array to that used by THAAD, manufactured by the same U.S. vendors. Arrow uses the same focal plane array materials as the Navy Standard Missile II Block IV A (SM-2 Block IV A). Arrow has obtained the only flight data currently available for one of those focal plane arrays. The data has been provided to THAAD and the SM-2 Block IV A programs. Other benefits for the U.S. TMD development programs include risk reduction data on hypersonic missile flight; lethality and kill assessment; target signatures for infrared and radio-frequency seekers; infrared signature prediction codes; booster stage separation at high velocities and dynamic pressure; and hypersonic flight performance of radomes in the endo-atmosphere.

Mr. Hunter: How committed do you think the Israelis are to ballistic missile defense in general and to the joint U.S.- Israel Arrow program in particular?

Gen. O'Neill: As the only nation directly facing a sizable and growing tactical ballistic missile threat from its neighbors, Israel is fully committed to the development of a tactical ballistic missile defense system with the Arrow interceptor as its centerpiece. As further evidence of its commitment to develop and field the Arrow Weapon System, Israel is solely funding and developing the other requisite components of the system -- its early warning radar, fire control center, and launch control center.

Mr. Hunter: Can you specify how much we have spent and how much Israel has spent on the program?

Gen. O'Neill: The total program cost for the Arrow/ACES program from FY88-95 is approximately $400M (~ $50M/yr. avg.). The Arrow/ACES efforts have been conducted under two contracts with Israel Aircraft Industries, Ltd. The Arrow Experiments contract had a value of $158M, of which the U.S. paid 80%, or $126.4M, with the Government of Israel paying the remainder. The ACES Contract is valued at $330M, of which the U.S. will pay 72%, or $238M, with the Israelis paying the remainder. The ADP is currently under negotiation with the Government of Israel and scope, funding levels and cost shares have not yet been determined.

The FY96 budget request for the Israeli Cooperative Program is $56.6M.

Mr. Hunter: Would you agree that Israel's contribution to the Arrow program is significant, especially considering the size of Israel's defense budget?

Gen. O'Neill: Israel is solely funding the Arrow Weapons System's early warning radar, fire control center, and launch control center. This is indeed a significant contribution for Israel in view of the other competing priorities in its defense budget. Israel, however, is willing to bear the cost in order to provide security against missile attack.

Mr. Hunter: How do Israeli BMD efforts compare with those of our allies?

Gen. O'Neill: Israel was the first allied nation to commit itself to the development and deployment of an anti-ballistic missile defense system. Israel's initiative pre-dates the Gulf War. Because of its proximity and vulnerability to ballistic missiles, including SCUD and AL Hussein missiles, Israel joined the United States in joint cooperative research and development programs with the objective of ultimately fielding a missile defense system. Israel's commitment intensified as a result of the missile attacks it incurred during the Gulf War and the post-war proliferation of missiles and weapons of mass destruction within the Middle East.

Regarding our other allies, there is now greater recognition among NATO nations and Japan of the existing and emerging ballistic missile threat and commitments are being made to counter that threat. For example, a NATO working group represented by nine NATO nations was established under the Conference of National Armaments Directors to exchange views on the ballistic missile threat and to define future opportunities and methods of collaboration. The working group identified several areas of prospective cooperation. As a separate initiative, France, Germany, Italy, and the United States agreed in February 1995, to cooperate on the joint development and production of the Medium Extended Air Defense System (MEADS).
In 1994, the United Kingdom commenced a 14-month Pre-Feasibility Study to determine its national missile defense requirements, including theater missile defense of its military forces abroad. In addition to its partnership in the codevelopment of MEADS, Germany is acquiring upgrades for its Patriot weapon systems and has initiated studies to address options for further Patriot improvements. Japan has initiated a study to assess its ballistic missile threat and identify its national missile defense needs. While many commitments by these allied nations have been dramatic, Israel is further ahead along the continuum of developing and deploying a missile defense system.

BOOST PHASE INTERCEPT

Mr. Hunter: What is the status of the U.S.-Israel BPI Cooperative Effort? Do you agree that a joint U.S.-Israel BPI program could potentially provide significant research and technology benefits to the U.S.? Can you describe how the Israeli-envisioned BPI system might work? How would it make a terminal missile defense more effective?

Gen. O'Neill: A contract with an Israeli firm (Wales, LTD.) to determine the benefits of the Israeli Boost Phase Intercept system (IBIS) concept to the United States is about to be signed. Plans are to utilize simulations and wargaming to establish the effectiveness of the Israeli concept under several scenarios. Simulation results quantifying the technical merits and drawbacks will be available in late CY 1995.

The joint U.S./Israeli BPI program can potentially provide significant benefits to the U.S. in the area of concept of operations, and may provide an interim cost effective boost phase intercept system while the U.S. develops a better long term system with greater stand off range.

The Israeli Boost Phase Intercept System (IBIS) concept is envisioned to be a constellation of low observable unmanned aerial vehicles (UAVs) flying at high altitude for extended durations. Each UAV would be equipped with air-to-air missiles used to negate Theater Ballistic Missiles (TBMs) during their boost phase. The concept envisions over-flight of enemy territory.

The IBIS concept can be utilized as the first tier of a multi-layered defensive system and can be used as a deterrent to the initial use of TBMs by an enemy and mitigates the possible saturation of terminal defenses. A drawback is that is must, because of the interceptor range, over fly enemy territory.

U.S.-ISRAEL AND U.S.-ALLIED COOPERATION

Mr. Hunter: How is BMDO and the Department of Defense working to help strengthen U.S.- Israel cooperation in Theater Missile Defense and other BMDO programs other than the Arrow missile project?

Gen. O'Neill: U.S.- Israel cooperation in theater missile defense has been -- and continues to be -- strengthened by several programs in addition to the Arrow. One such program is the joint Israeli Test Bed. This theater missile defense simulation facility permits evaluation of potential Israeli missile defense systems and configurations to assist in decisions regarding which defensive systems to field. It also is used to investigate battle management concepts and prepare Israeli Defense Force personnel to function operationally in a ballistic missile defense environment.

Another cooperative program was developed with Israel in April 1995, as a follow-on to the recently completed joint boost phase intercept study. The follow-on effort will examine the boost phase intercept concept developed by Israel and use simulations and analyses to determine areas of compatibility between Israeli and U.S. programs.

Additionally, the Ballistic Missile Defense Organization is negotiating an Arrow Deployability Project agreement with Israel. The proposed project would focus on integration of the jointly- developed Arrow interceptor with the Israeli-developed early warning radar, fire control radar, and launch control center. The project will also address issues of interoperability between Israeli and U.S. theater missile defense weapon systems.

Mr. Hunter: Would you agree that international cooperation with such U.S. allies as Israel and Japan is an indispensable component of the overall U.S. BMD effort? Can you cite some examples of areas where the U.S. has benefitted in terms of technology and experience from the ATBM programs of these defense partners?

Gen. O'Neill: International cooperation is an important component in the development of ballistic missile defense systems and is of mutual benefit to the cooperating participants. Cooperative anti-ballistic missile defense programs strengthen the security relationship between the United States and its allies; support our counterproliferation policies and strategies; help underwrite a portion of the cost of research, development, production, and operation; will help to provide protection of forces deployed abroad; allows access to foreign innovative technologies and unique capabilities; facilitates the definition of common requirements; and helps ensure interoperability.

The cooperative Arrow program has provided the United States with flight test data on focal plane arrays that have been useful in the Theater High Altitude Area Defense (THAAD) and SM-2 Block IV A programs. Other benefits of cooperation with Israel include risk reduction data on hypersonic missile flight and data on lethality and kill assessment, target signatures for infrared and radio-frequency seekers, infrared signature prediction codes, booster stage separation at high velocities and dynamic pressure, and hypersonic flight performance of radomes within the atmosphere.

Benefits from cooperation with Japan include information derived from missile defense architecture studies related to the Western Pacific region, technology assessments of advanced electronics and materials, test data on sample materials and devices, and information on the utilization of technology for low-cost production.

MIDDLE EAST SECURITY THREATS

Mr. Hunter: How will your programs help us meet these new threats?

Gen. O'Neill: Our ballistic missile defense programs will help us meet the growing ballistic missile threat in the Middle East along several dimensions. First, our near term improvements to existing air and missile defense systems, such as the HAWK upgrades, PATRIOT PAC-2 Quick Response Package, and PATRIOT PAC-2 Guidance Enhanced Missiles, will improve our ability to defend against shorter-range tactical ballistic missiles. Moreover, the Extended Air Defense Test Bed will be capable of wargaming and analyzing full theater-level missile defense scenarios, assist in battle management decision-making, and train personnel to operate in the complexities of a theater missile defense environment.

Additionally, our midterm "core" theater missile defense systems currently in the acquisition process -- PATRIOT Advanced Capability-3; Navy Standard Missile II Block IVA, or Navy Area Defense; and THAAD -- will have significantly improved capabilities for detecting, tracking, and engaging the full spectrum of theater ballistic missile threats. Because of its unique capabilities, THAAD will complement the other systems by providing a high altitude, or upper tier capability that will facilitate the defense of wide areas, dispersed forces, and populated areas.

Finally, as funds permit, our advanced capability programs, which are currently in the concept exploration phase -- the Navy's Theater Wide Defense, or Navy Upper Tier; the Medium Extended Air Defense System (MEADS), formerly Corps SAM; and Boost Phase Intercept (BPI) -- would, respectively, provide a sea-based capability for theater-wide protection, protect deployed maneuver forces against ballistic and cruise missiles, and demonstrate the capability of the concept to destroy tactical ballistic missile targets in the boost phase of flight while still over enemy territory.

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Saddam's Yellow Rain

We may have our misgivings about her trip to the Women's Conference, but we have to hand it to Madeleine Albright for her position on another China issue. The U.S. Ambassador to the United Nations has carried the ball for the Administration in bi-monthly Security Council fights with the Chinese, Russian and French in the Security Council over lifting Iraqi sanctions. (She's so infamous in Iraq that the nation's most prominent poet wrote a poem about her witchery in the nation's biggest newspaper.)

Now the defection to Jordan by Saddam's sons-in-law has forced Iraq's hand and yielded the information that Iraq planned to deploy a nuclear device by April 1991. It had armed 200 missile warheads with biological agents. And it was making its own biological agent, aflatoxin, in addition to the previously known anthrax and botulism. Interesting to those of us who have watched the story of yellow rain for decades is the news that Saddam, too, was developing his own yellow rain samples.

More data will emerge this week from the 130 footlockers Baghdad has handed over to the United Nations' Rolf Ekeus. We can all be sure the lockers will yield yet more reasons to go slow on the sanctions issue.

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but assured. Administration officials, however, have been saying for weeks that there is a tight "window" in which to try to prepare for a meeting between President Clinton and President Jiang during the 50th-anniversary celebrations for the United Nations. It is thus necessary to press an American diplomatic effort, the officials said, if only to stop the deterioration in relations and the escalating demonstrations of military power that China, and now Taiwan, are planning in the East and South China Seas.

The additional significance of the positive tone emerging from the talks this weekend is that it signals an easing in the explosion of anger among China's military leaders over American policy toward Taiwan.

It may also signal that Foreign Minister Qian, who has been the architect of China's recovery from the isolation that followed the 1989 Tiananmen massacre, has somewhat redeemed his influence in the management of foreign policy. It is a policy that has been undermined this summer in internal factional struggles both with the military leadership, and with the State Security Ministry, which supervised the apprehension and handling of Mr. Wu, the human rights activist.

In his remarks to reporters, Mr. Tarnoff placed great emphasis on a reiteration that "far from seeking to isolate China, we desire to engage the People's Republic in a wide-ranging and constructive relationship with us and with the international community."

"The relationship is important to them, as it is to us," he said, "and in many respects that is the message that I brought here: that we want to continue to talk about things, that we have too much at stake."

But Mr. Tarnoff said he could report no immediate progress on restoring ambassadorial relations that were in effect downgraded in June or on ending the cycle of military exercises China has undertaken this summer to intimidate Taiwan.

"I observed that two great powers such as China and the United States should have ambassadorial representation in their respective capitals in order for them to maintain a constructive exchange of views," he said.

Since Ambassador J. Stapleton Roy returned in June, China has yet to agree to the nomination of James Sasser, a former Senator from Tennessee, and the Chinese Ambassador, Li Daoyu, has not returned since being called back to Beijing in the same month.

Mr. Tarnoff continued: "I don't claim we have a meeting of the minds on the Taiwan issue. We did not receive any demands. We did not receive any threats."

But he said it was "welcome" news that China had ended its second military exercise of the summer on Friday, and he admonished both sides that "military exercises on one side or the other are not conducive to the kind of atmosphere that we hope would prevail."

Although giving w at appeared to be a bleak report on the lack of agreement on the status of Taiwan, human rights in China and weapons proliferation, Mr. Tarnoff said he was "encouraged" by the tone of the talks. Chinese officials, he said, "made clear how seriously they regarded the issue" of Taiwan, where the Nationalist Government once represented all of China at the United Nations, but with which Washington broke relations in 1979, when it established diplomatic ties with Beijing.

Mr. Tarnoff appeared to be unpersuasive in arguing that China should be willing to tolerate future visits by Taiwan leaders as long as they are "private, unofficial and personal in character."

In a dispatch issued by the official New China News Agency, Foreign Minister Qian was quoted as saying: "The U.S. permission of the visit by Lee Teng-hui had brought about serious consequences to relations between China and the United States, greatly hurt the feelings of the Chinese people and intensified the relations between the two sides of the Taiwan Strait."

"China hopes that such kind of event will never occur."

In earlier public statements, Chinese leaders have demanded that President Clinton take "concrete steps" to atone for the "mistake" he made in reversing longstanding United States policy on visits of Taiwan leaders. By allowing private but high-profile visits of Taiwan leaders, the United States is indulging in what Beijing sees as a strategy by Taiwan's President to pander to the island's pro-independence voters.

After President Richard M. Nixon opened relations with Beijing more than two decades ago, United States policy was to encourage China and Taiwan to negotiate their future under a "one China" policy.

Beijing considers Taiwan a province of China, but in recent years has sought to lure the Nationalist Government in Taipei to expand trade and investment ties with a goal of eventual reunification.

Mr. Tarnoff conceded that he was not able to say that he had "turned a corner" on any of the contentious issues that have incited a summer of tensions between Washington and Beijing.

Still, he said, "I certainly detected on the Chinese side an interest in engaging, in talking about our differences and in looking for ways for the dialogue to resume."

WEST...

from Pg. 2

connections to the secretive security force, whose members do not wear uniforms, are sometimes able to enlist it its services in private disputes.

While Preventive Security generally enforces strict Islamic morality, one well-known story, supported by a human rights lawyer on condition that its principals remain anonymous, tells of the force's activity on behalf of a prominent Christian family in Ramallah. The parents disliked their daughter's Muslim suitor, and the young man, abducted to the security force's Jericho headquarters and beaten intermittently for several days, was dissuaded from the match.

Once, when a Preventive Security agent learned by chance of a minor price dispute between The Washington Post and a Gaza merchant, he offered to "send a patrol" that night at midnight to the merchant's house. The Post's Palestinian employee, who understood the agent to mean that the merchant would be beaten and possibly arrested, persuaded Preventive Security to keep out of the matter.

The case of the Dirbas brothers shows as well how family and neighborhood vendettas play a role.

In 1990, during the intifada, masked men accused Dirbas's father of selling land to Israelis. They hanged him, and a feud began between the Dirbas brothers and one of their second cousins.

After Iyad Dirbas had his run-in with the Preventive Security agent, Mohammed Dirbas said he reported the theft of his brother's identity card to Israeli police. His cousin, he said, then told Preventive Security that Dirbas, like his father, was collaborating with the occupation authority.

During Mohammed Dirbas's first abduction, in May, he was beaten on the face, the soles of his feet and his groin. They did not stop beating him, he said, until he signed a confession that "I was a homosexual and a collaborator, that I recruited young girls as collaborators, and that I killed my father."

Upon his release, Dirbas said, he decided to kill his cousin for turning him in. He lay in wait with a chain and a knife, but his cousin learned of the ambush and had him abducted again to Jericho. This time, he said, Preventive Security held him for six days.

"They used to bring a plastic cup and set fire to it with a cigarette lighter and melt drops of it on my back," he said. "I had a big mustache, and they ripped it out. They made me sign more papers, and I don't know what was in them."

Dirbas, a construction worker, now comes out of his house only when his employer arrives to take him to work. At night he shuts himself inside.

"I used to visit relatives, go out with my friends and have a good time," he said. "Now I don't do this any more. Every time I go home, I expect that they will be waiting on the road."

CHICAGO TRIBUNE August 25, 1995 Pg. 4

Firm halts effort to ship fuel rods to U.S.

COLUMBIA, S.C.—A German company, frustrated with U.S. delays in accepting spent nuclear fuel rods at the Savannah River Site weapons complex, has decided to ship the controversial cargo to Scotland for reprocessing.

Berlin-based Hahn-Meitner Institut signed a contract with Britain to process the highly enriched uranium. It had waited months for Energy Department clearance to send the rods to the U.S., a lawyer for Hahn-Meitner told The Augusta (Ga.) Chronicle. Its decision came despite this week's federal appellate court ruling allowing the import of the rods. W603

FROM TRIBUNE WIRES

RUSSIA...from Pg. 1

hivering a six-page intelligence report on Iran's bomb-making ambitions to President Boris Yeltsin.

Moscow attracted widespread international criticism this year when it signed an $800 million deal to help Iran complete construction of a two-reactor nuclear power station at the Persian Gulf port of Bushire.

But according to confidential information acquired by the Sunday Telegraph, a new deal for two 400-megawatt reactors was struck after a Moscow visit this month by an Iranian delegation that included Reza Amrollahi, head of the country's atomic energy authority.

One member of the delegation was Seyyed Mohammed Rasouli, head of the Isfahan Nuclear Center, which is regarded by Western experts as the nerve center for Iran's nuclear weapons research program.

The official reason for the mission was to work out the details of the original Russian nuclear contract, under which Moscow agreed to complete construction of two nuclear reactors at the Bushire power station.

But while in Moscow, the Iranians negotiated the new deal, thought to be worth hundreds of millions of dollars to the Russians, which was signed last weekend when the Russians reciprocated by sending a delegation of nuclear experts to Tehran.

The two new reactors are destined for the Neka nuclear research complex in Iran's remote northern region. Little is known about the Neka complex apart from the fact that it is one of a network of highly sensitive Iranian nuclear research establishments that Western intelligence officials believe are being used to build Iran's atomic bomb.

Iran's ayatollahs have made no secret of their determination to acquire nuclear weapons, and experts believe Iran could develop a nuclear capability within five years.

International agencies such as the United Nations will regard Iran's nuclear pretensions with added urgency in the light of last week's disturbing revelations by Rolf Ekeus, the chief U.N. weapons investigator, that Iraq, Iran's neighbor and bitter enemy, came close to assembling its own nuclear weapon before the Gulf war in 1991.

Madeleine Albright, the American ambassador to the United Nations, described Mr. Ekeus' report as "chilling."

There is now every indication that Iran, a bigger and wealthier country, intends to emulate the Iraqis.

By the beginning of next year an estimated 1,500 Russian nuclear technicians will have arrived in Iran to work on the Bushire complex. That number can be expected to double once work commences on the Neka project.

In spite of the West's concern, most nuclear experts believed it unlikely that the Bushire reactors could be used to make nuclear weapons. But the same cannot be said for the Neka deal.

The fact that Iran will be able to build two nuclear reactors in a remote, underground bunker, far away from the prying eyes of U.N. nuclear weapons inspectors, should send a collective shiver down the spines of the West's intelligence community.

Iran's nuclear weapons program, which the rulers in Tehran refer to as "The Great Secret Project," was initiated in the mid-1980s. The Iranians are convinced that nuclear weapons are the most important strategic guarantee for their survival.

The Iranians have exploited every opportunity to acquire nuclear technology and resources. In addition to the Russian deals, they have received assistance from both Pakistan and China.

In addition, in 1992 they signed a secret deal with the former Soviet republic of Kazakhstan to purchase four nuclear warheads. The deal was foiled by agents working for the CIA.

Iran is currently estimated to be spending nearly $1 billion a year on its nuclear program.

The vast amount of money at Iran's disposal means it is able to "buy" some of the world's top nuclear experts. Hundreds of foreign technicians, mainly from China and Russia, are already employed by Iran in nuclear research, training Iranian specialists, supervising the construction of facilities and setting up nuclear reactors.

At Presstime

Chinese Army Representative Leaves for Honolulu

BEIJING (Aug 28) Xinhua - Li Xilin, Guangzhou Military Area commander of the Chinese People's Liberation Army, left here today for Honolulu, Hawaii, to attend a ceremony marking the 50th anniversary of the end of the Second World War.

The three-day celebration from September 1 to 3 is to be held by the US Department of Defense. Li, representative of Chinese National Defense Minister Chi Haotian, was invited by US Secretary of Defense William Perry.

Bosnian Army commander doubts peace plan

SARAJEVO, Aug 28 (Reuter) - The Bosnian Army's Commander has dismissed a U.S. peace initiative to end the three-year war in Bosnia as incoherent and told his troops the only direction forward is war.

General Rasim Delic said the American plan "still doesn't have either a head or a tail," in remarks yesterday which were reported on government television and radio.

Bangladesh, Mali call to lift Bosnia arms embargo

DHAKA, Aug 28 (Reuter) - Bangladesh and Mali called today for the U.N. Security Council to lift the arms embargo against Bosnia to allow its people to exercise their right to self-defence.

The two countries issued a joint communique after a four-day visit to Bangladesh by Mali President.

Yeltsin envoy in Chechnya, another Russian killed

By Rostislav Khotin

GROZNY, Aug 28 (Reuter) - Russian President Boris Yeltsin's personal representative to Chechnya, appointed to break a deadlock in peace negotiations, arrived in the rebel region today for a one-day inspection tour.

"I am visiting Chechnya to look at the situation, get some advice and prepare some concrete proposals," Oleg Lobov, secretary of Russia's policy-making Security Council, told reporters on his arrival in the regional capital Grozny.

He said a group of experts had already been working in the region to prepare for a Security Council meeting on August 30.

Australian Defence Forces clear Windows 95

CANBERRA, Aug 28 (Reuter) - Australia's defence authorities have cleared Microsoft Corporation's Windows 95 software after an investigation into security concerns, Defence Minister Robert Ray said today.

Ray told parliament the Royal Australian Navy had investigated the possibility the software posed a security threat after claims on the global computer network, the Internet, that part of the package allowed information to be passed back to Microsoft.

"The security analysis has been completed and, in essence, (the) defence (department) does not believe that there's any security concerns specific to the product," Ray said.

(Complete wire copy available at CNARS, Room 4C881)

NOTICE

The Current News ***Early Bird, Supplement, and Radio-TV Defense Dialog*** *are now available at www.dtic.dla.mil/ebird Read detailed instructions on the Early Bird "home page" or call the Defense Technical Information Center for information (703-274-7251, DSN 284-7251) These electronic publications* ***cannot*** *be made available to any addresses other than DoD and .mil sites*

PROLIFERATION THREATS IN THE 1990's

HOUSE OF REPRESENTATIVES, COMMITTEE ON NATIONAL SECURITY, MILITARY PROCUREMENT SUBCOMMITTEE, AND THE MILITARY RESEARCH AND DEVELOPMENT SUBCOMMITTEE,

Washington, DC, Wednesday, March 15, 1995.

The subcommittees met, pursuant to call, at 9:35 a.m. in room 2118, Rayburn House Office Building, Hon. Duncan Hunter (chairman of the Military Procurement Subcommittee) presiding.

STATEMENT OF HON. DUNCAN HUNTER, A REPRESENTATIVE FROM CALIFORNIA, CHAIRMAN, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. HUNTER. The hearing will come to order.

The Military Procurement and Research and Development Subcommittees once again, holding joint hearings, meet today in joint session to receive testimony on proliferation threats in the 1990's, and this afternoon, beginning at 2 o'clock, we will meet in closed session for a codeword-level briefing by senior intelligence community analysts, and we would strongly urge members to attend that important session.

Our purpose this morning is to review the extent of emerging threats to the United States and our military forces overseas from the proliferation of technologies that could be used to develop weapons of mass destruction and associated delivery means, and I noticed as I came in that the chairman of the R&D subcommittee, Mr. Weldon, has front page articles today, but they seem to be in the paper almost every day in this area, about new threats that come about as a matter of technology transfer.

But specifically today we hope to explore the current status among proliferant nations of development of nuclear, chemical, and biological weapons and associated delivery means, the future trends in the spread of weapons of mass destruction and associated delivery means, and, finally, the effectiveness of economic, political, diplomatic, and arms control measures to halt or slow the proliferation of nuclear, chemical, or biological weapons and associated delivery means.

Now to help us understand these important yet very complex issues, we are pleased to have with us this morning three outside experts on proliferation matters. They are Dr. Keith Payne, president of the National Institute for Public Policy, and Dr. Payne has testified before this committee on several occasions.

Dr. Payne, we are pleased to have you back with us. Thank you for being with us.

Next is Dr. Kathleen Bailey, senior fellow at the Center for Science and Technology Studies, Lawrence Livermore National

Laboratory, and Dr. Bailey is a celebrated analyst who has been published widely on this topic.

Dr. Bailey, welcome to you. Thank you for being with us.

Finally, Dr. Gary Milhollin, director of the Wisconsin Project on Nuclear Arms Control, whose work on nuclear matters and export controls has been of great assistance to this committee in the past.

Gary, the last time we were together we were doing, I think, a press briefing on export controls, and let me just say that your work and the work of some of your associates, I think, was part of the reason why this committee over the last several years, under the leadership of Mr. Dellums and Chairman Spence, has been—we have shown solidarity in this area of export controls, and it has been almost a unique event for the Armed Services Committee in that, as I recall, the objection that we had to the administration's Export Control Act last year was—as I recall, the opposition was unanimous in this committee, and a lot of that came from information that you helped to develop. So please accept our thanks for rendering this national service of letting us know what is happening with respect to technology transfer. We appreciate you.

So before yielding to my colleagues for any statements they might wish to make, let me make just a couple of general observations. First, it is a sad paradox that with the end of the cold war the likelihood that weapons of mass destruction will be used has arguably gone up not down. These weapons are becoming increasingly available, and any constraints imposed on the actions of third parties by the superpower rivalry have been loosened.

Second, the countries we should worry about most, the so-called rogue regimes, such as North Korea, Iran, Libya, Cuba, and Syria, seem to be pressing ahead about as fast as they can with WMD—weapons of mass destruction—and missile programs. These programs have in many instances already acquired these deadly capabilities and are now seeking to improve them, and our possession of superior conventional fire power may not be sufficient to deter them from attacking their neighbors or U.S. forces in theater.

Third, the ability of the United States and its allies to prevent proliferation in these countries is limited at best. Still, it is disheartening to learn that the U.S. Government, while talking a good game on nonproliferation, is at the same time loosening export controls on a variety of high-technology goods that have military application, and, Dr. Milhollin, my experience has been that you have to keep mowing the grass because as soon as we defeat one initiative to engage in what I would call a very deadly and dangerous technology transfer, there are advocates for a new wave of transfers beating on the doors at the executive branch and eliciting some support there. I think it is sad to say by doing so we have lost the moral high ground and no longer serve as a role model for other nations to follow in limiting their exports of dual-use items.

Fourth, I am not convinced that current arms control regimes such as the nuclear nonproliferation treaty and the missile technology control regime as well as future accords such as a comprehensive test ban treaty are capable of stopping proliferation. Nations that are intent on acquiring weapons of mass destruction and missiles can and will do so, and in some cases even while they are complying with these agreements. For example, Iraq came dan-

gerously close to fielding a nuclear weapon even they were given a clean bill of health by the International Atomic Energy Agency; North Korea is being rewarded for flagrantly violating its nonproliferation commitments and may still possess one or two nuclear bombs; and both of these examples disprove the myth that nuclear testing is required to make a crude nuclear weapon, thereby undermining a key rationale for a comprehensive test ban treaty.

In the aftermath of the cold war there is perhaps no greater security challenge than halting the spread of these deadly weapons. I would note that this is not a partisan issue. I have had a long and, I believe, productive relationship with Mr. Dellums and other less conservative members of this committee in seeking to strengthen export control policy, for example, and I mention that. I think that was one of the high points of this committee's activities in recent years, to come together under the leadership of Mr. Dellums and Mr. Spence and block what would have been a very tragic bill, I think.

So we look forward to continuing and broadening that collaboration between members on this committee, and, with that, I am pleased to yield to the distinguished chairman of the Research and Development Subcommittee, Mr. Weldon.

STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, MILITARY RESEARCH AND DEVELOPMENT SUBCOMMITTEE

Mr. WELDON. Thank you Mr. Chairman, and on behalf of the Research and Development Subcommittee I want to welcome you all here and look forward to your testimony.

I have had a chance to read your statements and look forward to getting into some dialog with each of you, and thank you, Mr. Chairman, for working together jointly so that we could have this series of hearings.

Originally this committee was going to have one ballistic missile threat hearing, and I suggested that we expand that, and, as you have probably heard, we are going to have four open hearings and one closed hearing as well as a fifth hearing on the Anti-Ballistic Missile [ABM] Treaty.

The idea here is not just to listen to General O'Neill, as we did last week, but in the case of today to listen to what you have to say about the threat that is out there and this afternoon to listen in a closed session about the threat, to listen at a future hearing to what we have gotten in the way of return on our investment in terms of dollars that we have spent in missile defense over the past 15 years in a detailed format, and, finally, to listen to former military officers who could have used missile defenses if they had been capable of being operational in past scenarios around the world, so that we will give Members of Congress the full opportunity to listen to a full discourse about why we are having this battle over missile defense, but based on facts.

What troubles me in regard to today's hearing is, certainly for the last 2 months and even before that, as a Member of Congress and member of this committee, trying to find out information about what the real threat is out there in the world, I have had a terrible amount of frustration in getting our intelligence community to

share with me data that I think is important for Members of Congress to have available at their fingertips.

I am not an alarmist, but when I read in Russian military publications some of the stories about what has been going on in Russia and go to our intelligence community and they tell me, "Well, we can't give it to you, that it is a classified document," it really outrages me, and that is one of the reasons why I wanted to have the first part of this hearing held in the open where we could lay some of this out for you.

For instance, I have no less than 15 specific citations from Russian and European media relating to the deliberate attempt by the Russians to sell off their architecture for the SS–20, SS–25, for space-based programs.

When I tried to get access to some of that information from our intelligence community, the response was, "We can't talk about that, we don't have any information." I have 10 pages of it here that has been published in the media, and yet Members of Congress are being told they can't get it.

Mr. Chairman, I am going to ask unanimous consent to submit this entire document in the record and give a copy to every member of this committee.

Mr. HUNTER. Without objection.

[The following information was received for the record:]

Jane's INTELLIGENCE REVIEW

THE WORLD IN CONFLICT 1994/95

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Ballistic Missile Proliferation — An Audit

Dr Keith B Payne

Introduction

Two of the prominent characteristics of the emerging post-Cold War period are regional conflicts and the proliferation of systems such as missiles and weapons of mass destruction (WMD). These developments are related in ways that are significant but often ignored. For example, the increasing frequency of regional conflict, based on ethnic, nationalistic and religious hostilities, suggests a tend toward disputes that are moderate in neither goals nor means. Simultaneously, as the result of proliferation, regional combatants increasingly will have the potential to inflict unprecedented levels of destruction deep within an opponent's territory from the outset of hostilities.

Causes and Symptoms

In the past, a warring country typically had first to contend with the military establishment of its opponent before it could threaten or reliably execute devastating strikes in an opponent's rear areas. In the emerging strategic environment, the combination of missiles and WMD will increasingly enable regional foes to threaten or annihilate with confidence an opponent's military or civilian targets. Indeed, one of the self-declared motives for developing countries to acquire missiles and WMD is to achieve a deterrent capability and coercive potential which is provided by such a lethal combination; this includes deterrence and coercion against external (eg Western) involvement. Former Indian Army chief of staff, General K Sundarji, for example, reportedly cited the Indian requirement for a deterrent based on missiles and WMD to discourage 'US bullying' and Western aggression.

There is an emerging consensus in the West that proliferation is a serious concern. NATO's Rome Summit in 1991, for example, included a statement agreed by the heads of state that the risk posed by 'the proliferation of ballistic missiles and weapons of mass destruction should be given special consideration'. Furthermore, the NATO summit in Brussels in January 1994 included direction by the same leaders to 'intensify and expand NATO's political and defence efforts against proliferation', and for the development of an overall NATO policy framework to meet the proliferation threat.

More than 25 countries, many hostile to the West, may have, or be in the process of, developing WMD and the means to deliver them. A senior CIA official has observed with regard to the proliferation of missiles and WMD that 'the potential capabilities of some countries are comparable to and, in some cases, more lethal than the Soviet threat in the 1960s'. He suggests further that a missile/WMD threat to Europe and against US overseas forces is maturing rapidly: 'Several countries already have, and others are developing, ballistic missiles that have a sufficient range to threaten US allies and forces in Europe, the Middle East, and Asia. Some have equipped these missiles with weapons of mass destruction and others are striving to do so.'

The proliferation of missiles and WMD and the increasing incidence of regional conflict belie earlier notions of a more benign 'new world order' following the Cold War. During the Cold War, a shared and reasonable fear of WMD and strategic means of delivery was assumed to moderate both goals and means. With the possible rare exception of the Cuban missile crisis, neither East nor West seemed inclined to accept extreme risks in pursuit of the rivalry.

In contrast, the emerging strategic environment appears to hold the potential for regional conflicts that lack this basic mechanism for 'crisis management' and, in the foreseeable future, these conflicts could involve WMD. As the CIA has observed, 'Of the nations that have or are acquiring weapons of mass destruction, many are led by megalomaniacs and strongmen of proven inhumanity or by weak, unstable or illegitimate governments. As a consequence, our classic notions of deterrence hold much less promise of assuring US and Western security.'

The proliferation of ballistic missiles is a key element in this disturbing trend. Most missile-producing or possessing states in the developing world also have WMD programmes, including the so-called 'rogue states' of Iraq (prior to the Gulf War in 1990-91), Iran, Libya, North Korea and Syria. Ballistic missiles offer some significant advantages for the delivery of WMD and conventional weapons. For example, missiles provide unsurpassed speed-to-target and may have ranges well beyond the realistic operational ranges of a developing country's air force. Consequently, time-dependent targets deep in an opponent's territory may be vulnerable to an unprecedented degree. In addition, mobile missiles appear to be nearly immune to pre-emptive strikes, and they can remain protected on sovereign territory until launch. During the Gulf War, for example, coalition aircraft and special forces combined may have been successful in destroying at most 'a handful' of Iraq's mobile 'Scuds', and there is no definitive evidence of any mobile 'Scuds' destroyed by air power independently. Finally, with the exception of the limited protection possible via the US Patriot or some Russian ballistic missile defence (BMD) systems, there is no active defence against ballistic missile attack available even to the Great Powers.

The appeal of ballistic missiles to developing countries was illustrated in the Gulf War. While coalition forces achieved complete air superiority very early and paralysed Iraqi air power, strikes by modified 'Scud-B' missiles continued to the end of the war. Iraq's use of missiles appears to have heightened their attractiveness in the Middle East.

There are three overlapping routes for countries seeking a ballistic missile capability: modification; indigenous production; and purchase.

Modified Designs

From the late 1960s through the early 1980s, ballistic missile proliferation and wartime use largely involved the 280 km range, road-mobile Soviet 'Scud B' and

its derivatives. This Soviet missile is a 1950s vintage successor to the old German V-2, and it has been armed with conventional, chemical and nuclear weapons.

The Soviet Union exported the 'Scud' within and beyond the Warsaw Pact. For example, in the early 1970s, the Soviet Union provided 'Scud Bs' to Egypt and Syria. Egypt used these missiles during the war with Israel in 1973. The Soviet Union also provided 120 km range SS-21s to Syria which is reported to have developed chemical warheads for its missiles, possibly with North Korean assistance. During the 1970s and 1980s, the Soviet Union provided 'Scud Bs' to Afghanistan, Libya and Yemen. In 1986, in response to US air strikes, Libya launched two of these 'Scud Bs' against US facilities on the Italian island of Lampedusa, both falling short of their intended target.

Initial Soviet 'Scud' transfers led to a second wave of proliferation, derived from the same missile. As a result, the 'Scuds' and modified 'Scuds' now are in the arsenals of numerous developing countries, including Afghanistan, Egypt, Iran, Iraq, Libya, North Korea, Syria and Yemen.

North Korea, for example, re-engineered the 'Scud B', based on several it had received from Egypt in the late 1970s, to produce its own modified 'Scud B' and two extended range missiles derived from the 'Scud B': these were the 500 km range 'Scud Mod C' and the recently tested 1000-1300 km range *No-dong* 1. North Korea delivered 100 'Scud Mod Bs' to Iran in 1987-88 for use in its war with Iraq and, in 1990, agreed to Iranian purchase of 'Scud Mod Cs'; shipments began in 1991. North Korea also delivered 'Scud Mod Cs' to Syria in 1991-93, and has supported efforts by Egypt, Iran and Syria to establish indigenous capabilities to produce modified 'Scuds'.

Iraq modified its own Soviet-supplied 'Scud B' to produce the 600 km *Al-Hussein* and *Al-Hijarah* missiles, and the 900 km *Al-Abbas* missile. Iraq subsequently launched 88 *Al-Hussein* and *Al-Hijarah* missiles against Israel and Saudi Arabia during the Gulf War.

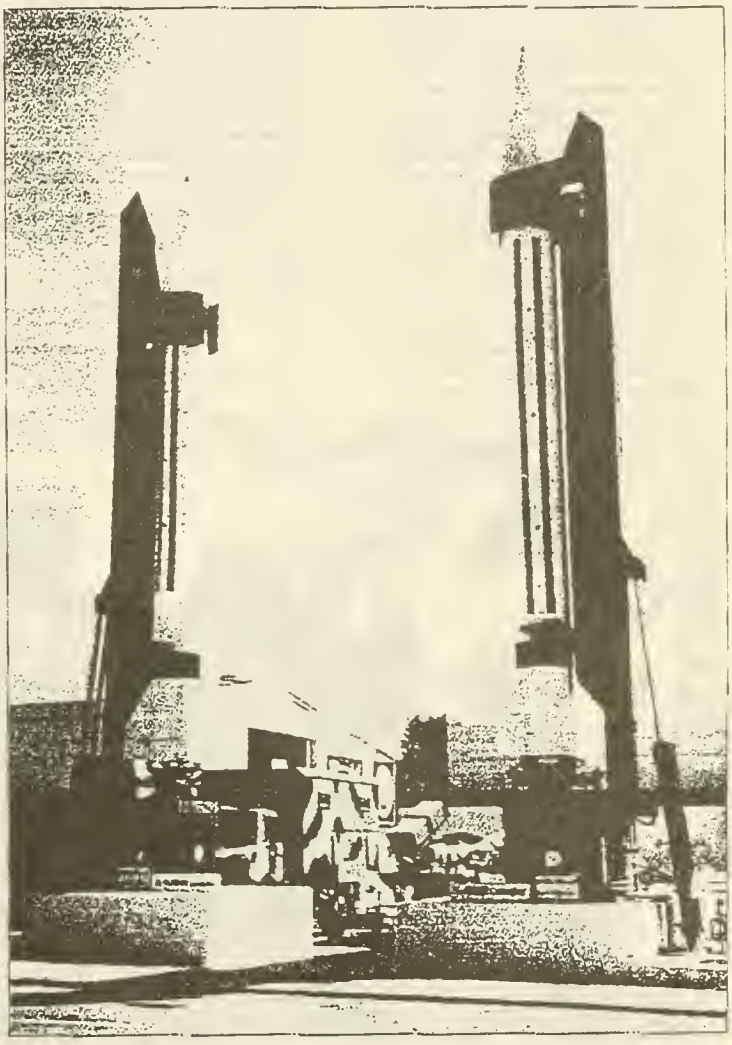
There have, of course, been other avenues to missile acquisition beyond the ubiquitous Soviet-supplied 'Scuds' and modified 'Scuds'. Other powers have provided missiles or missile technology to selected developing countries and, in some cases, these developing countries have subsequently modified the missiles. For example, the USA provided the 130 km range Lance to South Korea and Israel while South Korea converted US-supplied Nike-Hercules surface-to-air missiles into 250 km range surface-to-surface missiles: these were designated NHK. The 1500 km range, road-mobile Jericho II missile, under development in Israel, reportedly is based on US technology that was sold illegally. And the Pakistani *Hatf* 1 missile (80-100 km range) is reported to be based on French sounding rocket technology.

Indigenous Designs

In a few cases, developing countries, such as India, have produced missiles largely through indigenous efforts. Domestic development of long-range ballistic missiles (1000 km or more) is possible for only a handful of developing states with the necessary financial, technological and human resources. These states include Argentina, Brazil, India, South Africa, South Korea and Taiwan.

For example, India has developed the two-stage, 1500-2500 km range *Agni* missile, and tested it on three occasions — 1989, 1992, and most recently in February 1994. The second and third tests involved a manoeuvring re-entry vehicle. Rather than moving rapidly toward operational deployment of the *Agni*, a direction opposed by the USA

Iraqi Al-Hussein (left) and Al-Abbas (right) missiles.



and others, the Indians have labelled the *Agni* a 'technology demonstrator', and, according to recent public reports ordered eight or nine prototypes to be developed. These may involve solid propellants for the first and second stages. Some reports following the third *Agni* test suggested that it could be deployed by the end of the decade.

India also has indigenously developed the 150-250 km range *Prithvi* tactical missile which was paraded for the first time at the Republic Day Parade in 1994. User trials have begun with the army and it is expected to be deployed this year by both the army and air force. However, versions of the *Prithvi*, which is said to be nuclear capable, may have been deployed along the border with Pakistan in 1993. Some reports suggest that the missile has been tested with a manoeuvring warhead that provided an excellent accuracy (CEP) of 10 m.

Clearly, the trend is towards increasing numbers of countries able to produce missiles independently of industrialized suppliers. US Assistant Defence Secretary Ashton Carter recently noted that the increasing capability of some developing countries to produce missiles indigenously undermines the capacity of industrialized countries to control missile proliferation through restrictive trade practices: 'Export controls alone cannot prevent proliferation' because determined proliferators such as Saddam Hussein can 'home grow their weapons of mass destruction or get them from other countries'.

Purchased Designs

A potentially easier route to missile acquisition for some relatively prosperous developing countries is the purchase of systems from a willing supplier. Of late, those suppliers have been China and North Korea, both having sold entire missile systems to the developing world.

In 1988, for example, China announced the US$2 billion sale of medium-range (3000 km) CSS-2s to Saudia Arabia. The latter is now reported to have some 40 such missiles in its arsenal. In the mid-1980s, China appears to have decided to develop the M-Class of mobile, solid-fuelled, short and medium-range missiles for export to the Middle East and South Asia. These missiles include the 600 km M-9 and the 300 km M-11, both of which are thought to be more accurate than the 'Scud-B'. China reportedly has provided M-9 and M-11 manufacturing technologies to Iran and, in 1992, according to the US DIA China delivered M-11 missile-related technology to Pakistan. The latter transfer led in August 1993 to the US imposition of trade sanctions against China for non-compliance with the Missile Technology Control Regime (MTCR).

The question of Chinese missiles to Pakistan reached something of a climax in late September 1994 when numerous press accounts appeared, denied by China and Pakistan, of earlier deliveries of Chinese M-11 launchers and missiles to Pakistan. In Washington, on 4 October, Chinese Foreign Minister Qian Qichen offered a 'reaffirmation' of China's commitment to abide by the MTCR in exchange for the lifting of the US trade sanctions. There remains some concern, however, about the actual meaning of this Chinese commitment. This is because the Chinese previously have defined the M-11 as falling outside MTCR guidelines. Moreover, the previous Chinese MTCR commitment — the one presumably 'reaffirmed' by Foreign Minister Qichen — was offered in 1991 and 1992, and the Chinese have not agreed to adhere to the MTCR guidelines as expanded in 1993. This may be significant because the 1993 revision closed some critical loopholes in the coverage of the MTCR.

North Korea's continuing progress in missile development and its aggressive missile marketing internationally is most noteworthy. As the director of the CIA has remarked of North Korean missile marketing, 'it is willing to sell to any country with the cash to pay'. In fact, the

India's Prithvi missile on parade in January 1994. (Photograph R. Bedi)

most recent and dramatic developments concerning missile proliferation focus on North Korea.

For example, in May 1993, North Korea flight tested the 1000-1300 km range, mobile *No-dong* 1; this is a stretched 'Scud', sometimes referred to as a 'Scud Mod D'. The *No-dong* 1 is believed to be capable of carrying nuclear, biological or chemical payloads, and could, according to US defence officials, be deployed by 1996. Indeed, a draft of the US Naval Intelligence posture statement for 1994 reportedly warned that the North Koreans could fit the *No-dong* 1 with a nuclear warhead as early as 1995, although 2000 may be more likely. The deployment of this missile in Iran, Libya and North Korea would place at risk much of Japan and Israel, as well as US bases and European capitals in the Mediterranean area.

North Korea continues its penchant for international missile sales with the *No-dong* 1, including discussions with Iran, Libya and Syria. Already, North Korea appears to have concluded an agreement to provide the *No-dong* to Iran and to assist Iran in the construction of a suitable missile facility. In early 1994, however, reports began to appear that Japan had applied economic pressure on Tehran to cancel its purchase of *No-dong*. Subsequent reports indicated that Japan similarly pressured Tehran to cancel a scheduled *No-dong* 1 test firing in Iran by threatening to withhold funding for a US$1.2 billion dam project.

Numerous reports surfaced in 1994 of North Korean development of at least two additional missiles with ranges well beyond that of the *No-dong* 1. While there continues to be considerable speculation about these missiles, the CIA believes that if launched from North Korea they could threaten 'all of Northeast Asia, Southeast Asia, much of the Pacific area, and even most of Russia'. If North Korea transfers these missiles to Iran and Libya, as seems likely, 'all the capitals of Europe could be threatened'. These new two-stage missiles are identified publicly as the *Taep'o-dong* 1 and *Taep'o-dong* 2. The former, according to recent unofficial estimates, has a potential range of approximately 2000 km, while estimates of the *Taep'o-dong* 2's potential range vary from 3500 km to 9600 km. According to mid-1994 public reports, these missiles could be operational as early as early as 1996 and 2000 respectively.

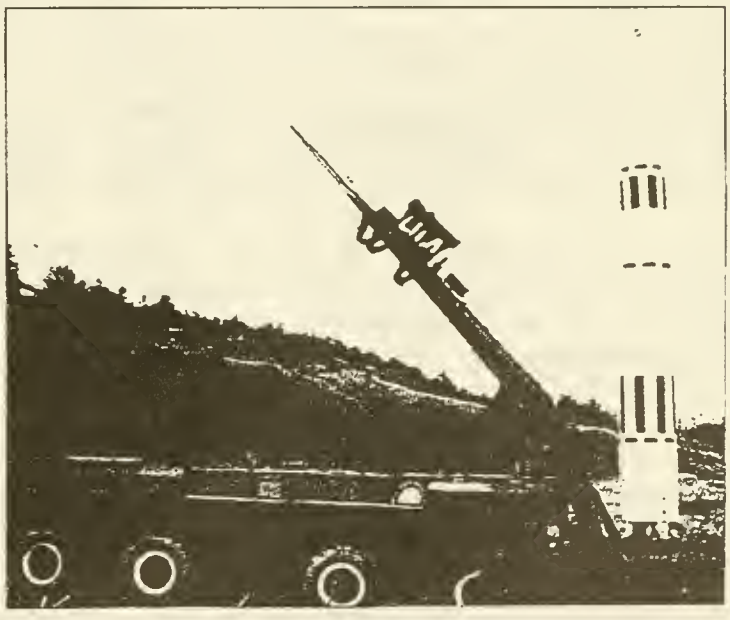
North Korea's *Taep'o-dong* series of missiles represents a major technological advance over the family of modified 'Scud' missiles. They appear to be the first of a new generation of multi-stage missiles that may have benefitted significantly from advanced Chinese missile technology. There is some speculation that the *Taep'o-dong* 1 is a combination of a *No-dong* 1 first stage and a 'Scud' derivative second stage, and that the *Taep'o-dong* 2 is a composite derivation of a Chinese DF-3 first stage and a *No-dong* second stage. Others speculate that Chinese assistance on the *Taep'o-dong* missiles may extend to the possibility that the *Taep'o-dong* 1 is an M-11 upper stage installed on a booster derivation of the *No-dong* 1, and that the *Taep'o-dong* 2 is an M-11 upper stage on a booster derivation of the Chinese DF-3.

Finally, there has been some recent discussion of North Korean development of a dedicated ICBM, the so-called No-dong X, that has again benefitted from Chinese missile technology, as well as the support of Russian engineers and technicians working in North Korea. The X reportedly has been referred to as a 'long-range assault weapon' by the Russians and 'a strategic weapon' by South Korean officials. While there has been no publicly reported discussion of this possible missile by US intelligence officials, some Congressional speculation suggests that the missile could have a range of 6000 km and be operational by 1997.

North Korean missile and WMD developments obviously are of particular interest to Japan. Japanese reaction has been understandable and possibly indicative of the type of reactions that will multiply as missile proliferation proceeds during the decade. Japanese Prime Minister Kichii Miyazawa labelled the prospect of North Korean missile and WMD a 'grave concern'. And, on 28 July 1993, the then Japanese Foreign Minister Kabun Muto suggested that North Korean programmes could compel the Japanese to move toward nuclear weapons if necessary: 'If North Korea develops nuclear weapons and that becomes a threat to Japan, there is first the nuclear umbrella of the USA upon which we can rely. But if it comes down to the crunch, possessing the will that 'we can do it' is important.'

Japanese concern about North Korean intentions may well be appropriate. In an interview with the YONHAP News Agency, and again in a speech in April 1994 before the UN Economic and Social Commission for Asia and the Pacific, Cha Pong-chu, the North Korean ambassador in New Delhi, reportedly stated that 'Our nuclear arms, if developed, would be primarily designed to contain Japan'. With the North Koreans recognized as soon having operational missiles that can reach Japan, the potential to build one or two nuclear weapons now, nevermind the existing stockpile of biological and

The M-11 has a range of 300 km.

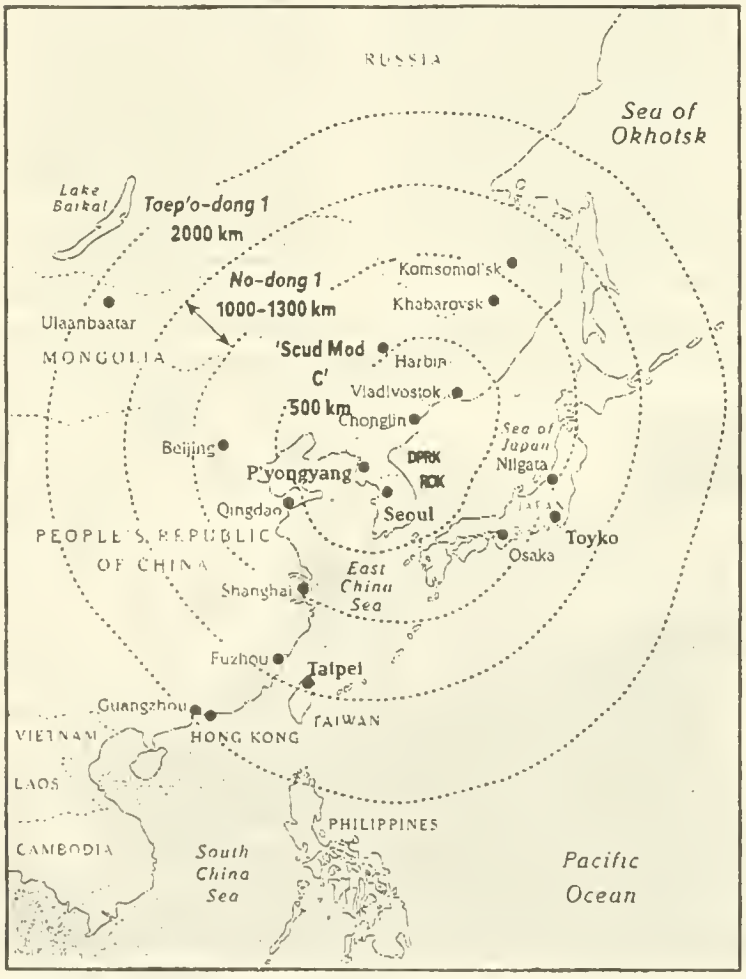


chemical weapons, must make the Japanese leadership realize that non-proliferation efforts may fail vis-a-vis North Korea. As a result, Japan may begin to consider the various options available to counter this combined missile/WMD threat.

It may seem shocking that Japan would respond to the prospective combination of North Korean missiles and nuclear weapons by considering the nuclear option itself, particularly when the notion is expressed by senior government officials. This view, however, appears to be an extension of previous Japanese thinking. In August 1994, press accounts emerged of a top-secret Japanese report from 1969 entitled 'Prerequisites of Japan's Foreign Policy'. The report, now acknowledged by the Japanese Foreign Ministry, stated that Japan would 'maintain the economic and technical potential of producing nuclear weapons', but 'for the time being, we will adopt a policy of not possessing nuclear arms ... Recent and foreseeable developments in North Korean missile and WMD capabilities could obviously be the trigger for the Japanese to rethink their security policies'.

In an important report in August 1994 entitled 'The Modality of the Security and Defence Capability of Japan', the Japanese prime minister's Advisory Group on Defence Issues insisted that Japan will maintain its non-nuclear policy and continue to rely on the US nuclear umbrella. The report, however, identifies 'limited missile attack' as one of only a handful of critical threats facing Japan in the post-Cold War period. It concludes that 'Japan itself should hold the capability of dealing with and defending against ballistic missiles. To that end, Japan should make positive efforts toward possessing such a capability in collaboration with the United States where research in this area is most advanced.'

Potentially more significant than aggressive North Korean marketing of missiles is the possibility of Russian missile sales on the international market. Recently, Russia has committed itself to restrictions on missile exports consistent with the MTCR. There is, however, serious question about Russia's internal capacity to enforce such restrictions, particularly given the attractiveness of the market and the power of organized crime in Russia. In addition, there have been previous efforts, apparently sanctioned by the government, to market Russian missiles. For example, at a recent arms show in Moscow, Russians attempted to market a derivative of the SS-23 (500 km range) as a civilian rocket. Similarly, at another arms show in Abu Dhabi in 1993, Russians advertised an improved warhead for the 'Scud'.



Conclusion

In summary, missile proliferation continued apace during the early 1990s, with the most dramatic events being the North Korean development of multi-stage missiles and the aggressive North Korean marketing of missiles to 'rogue states' in the Middle East. The trend in missile proliferation obvious through 1994 is clearly toward systems of greater reliability, range, accuracy and payload.

Dr Keith Payne is President of the National Institute for Public Policy, and Adjunct Professor, Georgetown University. The views and findings contained in this article are those of the author and should not be construed as representing the position or policy of the US Government or the National Institute for Public Policy. All references used in the preparation of this article can be obtained from the editor.

JIR References:
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JIR Special Report, 'North Korea — A Potential Time Bomb', No 2, April 1994

Mr. WELDON. Then I look at organizations like the Office of Technology Assessment [OTA] that came out with this publication that I would recommend to any Member of Congress, published last year, called "Proliferation and the former Soviet Union." Specific documentation in there about incidents where members of the Russian military in one case at Murmansk allegedly stole some material that could have been used for a nuclear weapon, further documentation of an incident in December 1992 where 50 of the most well-trained and well-versed Russian rocket scientists from the Makayev Design Bureau were leaving the Sheremetevo Airport to go to North Korea but were stopped by the Russians at the airport, documentation in the London Observer last May that the British intelligence claims that Iran had purchased eight SSN–22 Sunburn supersonic cruise missiles. When I ask for this information from our intelligence community, I'm told we can't talk about that or we have got to do it in a private session.

Mr. Chairman, I want to tell you, I'm a little bit fed up. As a Member of Congress and a member of this subcommittee, I want to base my decisions on factual information. If the things that I have here have been or can be refuted, fine, but there should be a full and open discourse in this country about the threat that is out there. There should not be an attempt to hide from us factual information that news media across the world are reporting on a regular basis.

This is not some isolated situation where we had one account in one Russian newspaper. I have 15 articles from the Russian technical newspapers as well as their TV stations documenting deliberate attempts, even at one point hiring a Houston-based firm, the Space Commerce Corp., to market what had been their SS–20 and SS–25 systems to countries around the world, not just Brazil, by the way, but also Australia, and even to have those launches occur in the United States.

So the purpose of this hearing in the first part is to publicly bring this information out, to share it with our colleagues, and to share it with the American public, and in the afternoon to grill the intelligence community about why we are not getting access to more up-to-date information.

Just for the record, I would mention that these two documents are the emerging ballistic missile threat to the U.S. study team documents from BMDO. I have been told that BMDO has not been allowed to declassify the most recent report for Members of Congress and the American public. Mr. Chairman, that is outrageous, and I would ask you and our full committee chairman to ask the Secretary of Defense why this most recent document on missile threat proliferation cannot be released to us so that we can have it, and I would also cite the concerns raised by General O'Neill in a recent speech that he gave saying that our ballistic missile threat assessment is grossly outdated.

So with all of that, putting into context this hearing, we have a lot of work to do, but I think when we make the final decision about how quickly to move and how far to move in terms of missile defense, that we do it based on factual information and all the available data that is out there, both in the foreign media as well as from our intelligence community.

Thank you.

Mr. HUNTER. I thank the gentleman. He makes an excellent point, and you can be assured that I will work with him to see to it that we get enough facts out here so that we can apprise our constituents and our colleagues of what is happening, and I would now yield to the gentleman from Missouri, Mr. Skelton, who is the ranking member on the Procurement Subcommittee.

STATEMENT OF HON. IKE SKELTON, A REPRESENTATIVE FROM MISSOURI, RANKING MINORITY MEMBER, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. SKELTON. Thank you, Mr. Chairman, and I think this is an excellent idea to have this hearing today and also look forward to the classified one this afternoon.

This is a follow-on hearing to the one we had on March 9. I hope today's testimony will shed light on the important subject of ballistic missile defense.

In last week's hearing I made note of my support of the theater missile defense system as a means to protect our troops. There is nothing more important, and I know, Mr. Chairman, I often sound like a broken record when I speak about our troops, but they are the ones for whom we are concerned, and they are the ones who will win any conflicts, after it is all said and done.

I have also noted my concerns both here and on the floor about spending too much money vis-a-vis ballistic missile defense and the care for the troops on the national missile defense system. I was concerned about spending more than what was appropriated last year. The advancement of the ballistic missile defense system involves strategic threat implications, and discussing the nature of the existing threat is important, and, frankly, it is paramount. We should be concerned about the proliferation of weapons throughout the world, but given the current budgetary environment we must also discuss the nature of the American response to such threats.

Mr. Chairman, it appears that other countries that are potential threats to our national interests in different parts of the world have the luxury of putting all or most of their eggs in one basket. One country is specializing in submarines, another country may be specializing in theater missiles which may or may not carry bacteria, chemical, and other types of warheads. We in our country, because of our role in this world as the bastion of freedom, find ourselves having to deal with each one of these potential threats, each one of which can be and is substantial.

Which leads me, Mr. Chairman, to saying that we must look very, very hard at the overall military defense budget. I am convinced that what we do this year on the budget and what we do next year on the budget will determine whether our country 10 years hence will be a military power as we want it and as we need it for our national interest. I think it is so very important that that will determine whether we do what you need to do as chairman of this committee, not just in ballistic missile defense but in other areas that are so terribly important for our national security.

So I look forward to working with you not only on this but on other important systems that will shed a great deal of light toward our national security.

Mr. HUNTER. I thank the gentleman for his eloquent statement, and let me just say again that we are privileged to have the ranking member of the full committee and the chairman of the full committee with us in this joint hearing, and the chair will exercise its prerogative to ask either gentleman if they would like to make a statement before we begin.

Mr. Chairman, would you like to make a statement?

Mr. SPENCE. No, thank you.

Mr. HUNTER. Mr. Dellums, would you like to make a statement before we begin?

Mr. DELLUMS. I thank the gentleman for his generosity, but I look forward to the testimony of our witnesses, and I would yield back the balance of my time.

Mr. HUNTER. Excellent. Thank you.

Dr. Payne, we will just go from right to left. Thank you for your participation in the past, and we look forward to your testimony. The floor is yours.

STATEMENT OF KEITH PAYNE, PRESIDENT, NATIONAL INSTITUTE FOR PUBLIC POLICY

Dr. PAYNE. Thank you, Mr. Chairman. It is a pleasure and an honor to be here. I thank you for the opportunity to present my views on the subject of proliferation and missile defense.

I would like to provide an uncharacteristically short prepared statement and submit the supporting material for the record.

More than 25 countries, many hostile to the West, may have or be developing weapons of mass destruction and missiles to deliver them. In many cases these missiles are more lethal than the German V1 and V2's launched against Britain in 1944 and 1945, missiles which, I should add, caused 67,111 casualties, damaged or destroyed 2 million homes, significantly reduced British morale and defense production, and led to the loss of 450 aircraft and 2,900 air crew in allied operations against V1 and V2 facilities.

I add this historical note because I think it is useful to recall the extensive damage caused by these primitive, militarily insignificant, conventionally armed missiles over 50 years ago. In the emerging strategic environment the combination of more sophisticated missiles and weapons of mass destruction will enable regional foes either to threaten or to annihilate western military and civilian targets at the outset of hostilities. Indeed, one of the primary reasons for developing countries to acquire missiles and weapons of mass destruction is for their deterrence and coercive potential including deterrence and coercion of the United States.

Occasionally the suggestion is made that missile proliferation is not particularly alarming because an opponent can always find other means to deliver weapons of mass destruction using covert agents or sabotage, for example. That assertion, I believe, is ignorant of the simple fact that developing countries want missiles for the advantages that they offer. For example, missiles can have ranges well beyond the realistic operational ranges of a developing country's air force. In addition, mobile missiles appear to be nearly immune to preemptive strikes, and they can remain protected on sovereign territory until they are launched, and following launch they simply are unlikely to be intercepted. Currently there are only

very limited defense capabilities against ballistic missile attack even for the great powers. In short, missiles are excellent tools for the desired purposes of deterrence and coercion; trucks and saboteurs are not.

How do countries acquire missiles and from whom? There are three overlapping routes for countries seeking ballistic missiles: Purchase, modification, and indigenous production. From the late 1960's through the early 1980's ballistic missile proliferation and wartime use largely involved the 1950's vintage Scud B and its derivatives. The Soviet Union exported the Scud within and beyond the Warsaw Pact, and these initial Soviet Scud transfers led to a second wave of proliferation derived from the same missile. As a result, Scuds and modified Scuds now are in the arsenals of numerous developing countries including Afghanistan, Egypt, Iraq, Iran, Libya, North Korea, Syria, and Yemen.

Iraq modified its own Soviet-supplied Scud B's to produce the 600-kilometer-range Al–Hussein and the Al–Hijarah missiles and the 900-kilometer-range Al–Abbas missiles, and Iraq subsequently launched 88 of these missiles, the Al–Hussein and the Al–Hijarah, against Israel and Saudi Arabia during the gulf war.

In a few cases developing countries such as India have produced missiles largely through their indigenous efforts. For example, India has developed the two-stage 1,500 to 2,500-kilometer-range Agni missile and tested it on three occasions in 1989, 1990, and 1992, and most recently in 1994.

But it should be noted that the trend in missile proliferation is toward increasing numbers of countries able to produce missiles independently of industrialized suppliers, and this increasing capability of developing countries to produce missiles indigenously undermines our capacity to control missile proliferation through restrictive trade practices. As a result, export controls such as the Missile Technology Control Regime cannot alone prevent proliferation because determined rogue countries such as Iraq and North Korea will home grow their missiles and their weapons of mass destruction, and, unfortunately, I believe, deterrence is unlikely to be a reliable countermeasure following proliferation.

A route to missile proliferation for some relatively prosperous developing countries is the purchase of systems from a willing supplier. Of late those suppliers have been China and North Korea, both having sold entire missile systems in the developing world. North Korea's continuing progress in missile development and its aggressive marketing of missiles internationally is most noteworthy. As former CIA Director Jim Woolsey remarked of North Korean missile marketing, it is willing to sell to any country with the cash to pay.

The most recent dramatic developments concerning missile proliferation focuses on North Korea. For example, in May 1993 North Korea flight tested the 1,000- to 1,300-kilometer-range mobile Nodong–1. More recently it reportedly flight-tested a missile, possibly a Nodong–1, to 1,500 kilometers. This, I should add, would enable North Korea to target virtually all of Japan.

The Nodong-1 is believed to be capable of carrying nuclear, biological, or chemical payloads and could be deployed this year or in 1996 at the latest. The deployment of this missile in North Korea,

in Iran, and Libya would place at risk much of Japan, Israel, and United States bases in European capitals in the Mediterranean area.

North Korea continues its penchant for international missile sales with the Nodong–1, including discussions with Iran, Syria, and Libya. In fact, North Korea appears already to have concluded an agreement to the Nodong–1 to Iran and to assist Iran in the crux of a Nodong missile facility.

More ominously, numerous reports surfaced in 1994 of North Korean development of at least two additional missiles with ranges well beyond that of the Nodong–1. These are the so-called Taepodong–1 and Taepodong–2 missiles. From North Korea they could strike all of Northeast Asia, Southeast Asia, much of the Pacific, and most of Russia. If North Korea transferred these missiles to Iran and Libya, as seems likely, all the capitals of Europe could be threatened.

The Taepodong–1, according to recent unofficial estimates, has a potential range of approximately 2,000 kilometers, while estimates of the Taepodong–2's potential range vary from 3,500 kilometers to 9,600 kilometers. If the latter is more accurate, it becomes an Intermediate Range Nuclear Forces Treaty ICBM-class missile.

Deputy Secretary of Defense John Deutch has stated that with the fielding of the Taepodong–2 Alaska and Hawaii could be threatened. This suggests a range potential of 6,000 kilometers or so for the Taepodong–2, indeed placing it in the ICBM category. According to public reports, these missiles could be operational as early as 1996 and the year 2000, respectively. Other long-range missiles will, I believe, emerge under the guise of civilian space launch vehicles.

In summary, missile proliferation continues apace, with the most dramatic developments being the North Korean development of multistage missiles and their aggressive marketing of missiles to rogue states in the Middle East, including Iran. If this missile threat is not addressed, the United States and its allies will be subject to deterrence and to coercion by otherwise third-rate powers armed with missiles and with weapons of mass destruction. We will forfeit our capability to project force into any regional context at an acceptable level of risk. In short, we will cease being a superpower. This is not hyperbole but the clear direction in which we are headed unless we address the emerging threats posed by missiles and weapons of mass destruction.

Thank you.

The United States House of Representatives
Committee on National Security

Military Procurement and Research and Development Subcommittee

Hearings On:
The U.S. Response to the Emerging Proliferation Threat

Testimony By:

Dr. Keith B. Payne
President, National Institute For Public Policy
Faculty, Georgetown University, National Security Studies Graduate Program

Ballistic Missile Proliferation: A Quick-Look Summary

Rayburn House Office Building
Room 2118, 9:30 a.m.

March 15, 1995

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Ballistic Missile Proliferation: A Quick-Look Summary[1]

Dr. Keith B. Payne

President, National Institute for Public Policy
Adjunct Professor, Georgetown University

More than 25 countries, many hostile to the West, may have or be developing weapons of mass destruction (WMD) and missiles to deliver them. In many cases these missiles are more lethal than the German V-1 and V-2s launched against Britain in 1944 and 1945, which caused 67,111 casualties, damaged or destroyed almost 2 million homes, significantly reduced British morale and defense production, and led to the loss of 450 aircraft and 2,900 pilots and aircrew in allied air operations against V-1 and V-2 facilities.[2]

In the emerging strategic environment, the combination of more sophisticated missiles and WMD will enable regional foes either to threaten or to annihilate Western military or civilian targets at the outset of hostilities. Indeed, one of the primary motives for developing countries to acquire missiles and WMD is for their deterrence and coercive potential—including deterrence and coercion of the United States.

Occasionally, the suggestion is made that missile proliferation is not particularly alarming because an opponent can always find other means to deliver WMD—using covert agents and sabotage for example. That common assertion is ignorant of the simple fact that developing countries want missiles for the advantages they offer. For example, missiles can have ranges well beyond the realistic operational ranges of a developing country's air force. In addition, mobile missiles appear to be nearly immune to preemptive strikes, and they can remain protected on sovereign territory until launch. And, following launch, they are not likely to be intercepted: currently there are only very limited defense capabilities against ballistic missile attack available even to the Great Powers. In short, missiles are excellent tools for the desired purposes of deterrence and coercion—trucks and saboteurs are not.

How Do Countries Acquire Missiles, and From Whom?

There are three overlapping routes for countries seeking ballistic missiles: purchase, modification, and indigenous production. From the late 1960s through the early 1980s, ballistic missile proliferation and wartime use largely involved the 1950s-vintage Soviet Scud-B and its derivatives.

The Soviet Union exported the Scud within and beyond the Warsaw Pact. These initial Soviet Scud transfers led to a "second wave" of proliferation, derived from the same missile. As a result, Scuds and modified Scuds now are in the arsenals of numerous developing countries, including Afghanistan, Egypt, Iraq, Iran, Libya, North Korea, Syria, and Yemen.

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The trend in missile proliferation is towards increasing numbers of countries able to produce missiles independently of industrialized suppliers. This increasing capability of developing countries to produce missiles indigenously undermines our capacity to control missile proliferation through restrictive trade practices. As a result, export controls alone cannot prevent proliferation because "rogue" countries such as Iraq and North Korea will "home grow" their missiles and WMD.

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Numerous reports surfaced in 1994 of North Korean development of at least two additional missiles with ranges well beyond that of the Nodong-1, the Taepodong-1 and Taepodong-2. From North Korea they could strike, "all of Northeast Asia, Southeast Asia, much of the Pacific area, and even most of Russia."[3] If North Korea transfers these missiles to Iran and Libya, as seems likely, "all the capitals of Europe could be threatened."[4] The Taepodong-1, according to recent unofficial estimates has a potential range of approximately 2000 km, while estimates of the Taepodong-2's potential range vary from 3500 km to 9600 km. Deputy Secretary of Defense John Deutsch has stated that with the fielding of the Taepodong-2, Alaska and Hawaii could be threatened. This suggests a range potential of approximately 6000 km for the Taepodong-2, placing it in the ICBM category. According to public reports, these missiles could be operational as early as 1996 and 2000, respectively. Other long-range missile threats will, I believe, emerge under the guise of civilian space-launch-vehicles.

In summary, missile proliferation continues apace, with the most dramatic developments being the North Korean development of multistage missiles and the aggressive North Korean marketing of missiles to "rogue states" in the Middle East, including Iran.

If this missile threat is <u>not</u> addressed, the United States and its allies will be subject to deterrence and coercion by otherwise third-rate powers armed with missiles

and WMD. We will forfeit our capability to project force into regional theaters at an acceptable level of risk. In short, we will cease being a superpower. This is not hyperbole, but the clear direction in which we are headed unless we address the emerging threats posed by missile and WMD proliferation.

Notes

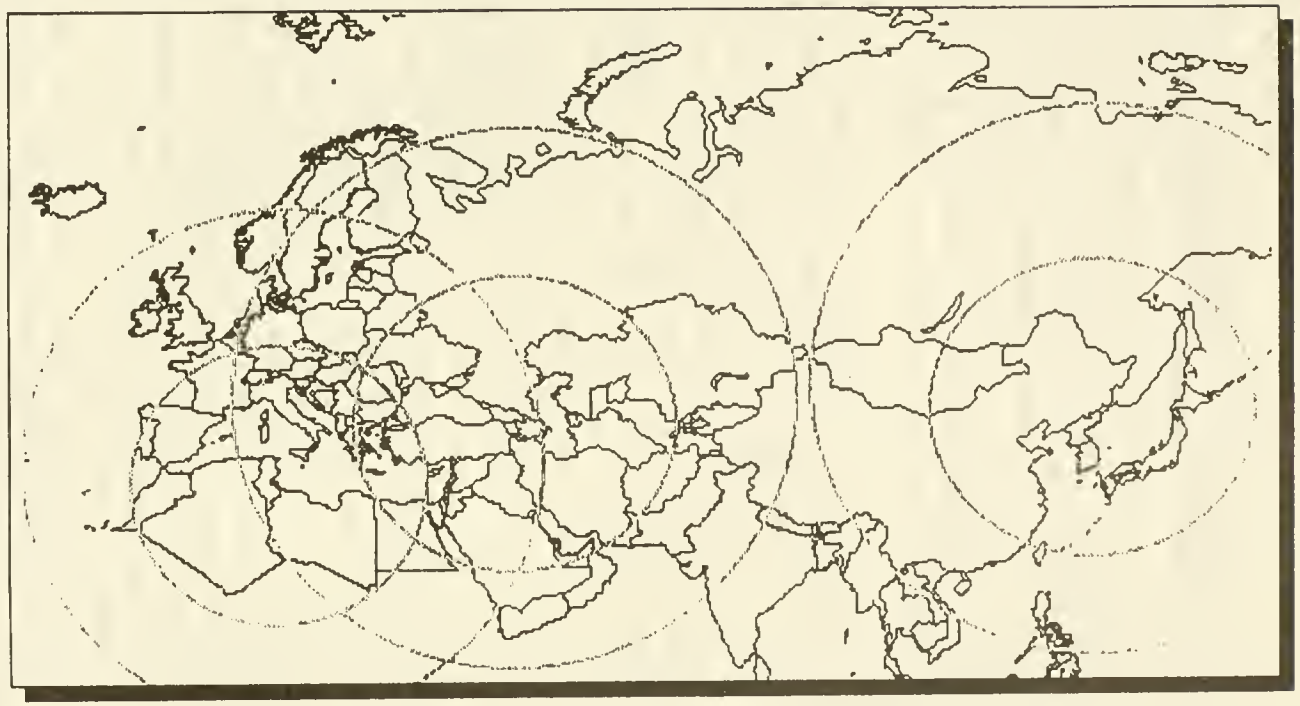
[1]This testimony draws from, Keith Payne, "Ballistic Missile Proliferation: A Quick-Look Summary," *The World In Conflict 1994/95, Jane's Intelligence Review* (January 1995), pp. 20–24.

[2]Data from Robin Ranger, "Theater Missile Defense: Lessons from British Experiences with Air and Missile Defenses," *Comparative Strategy* Vol 12, No. 4 (October–December 1993), pp. 405–407.

[3]James Woolsey, Presentation at the National Defense University series on "BMD, Counterproliferation, Arms Control and Deterrence," Washington, D.C., June 22, 1994.

[4]Woolsey, "BMD, Counterproliferation, Arms Control and Deterrence."

POTENTIAL THREAT

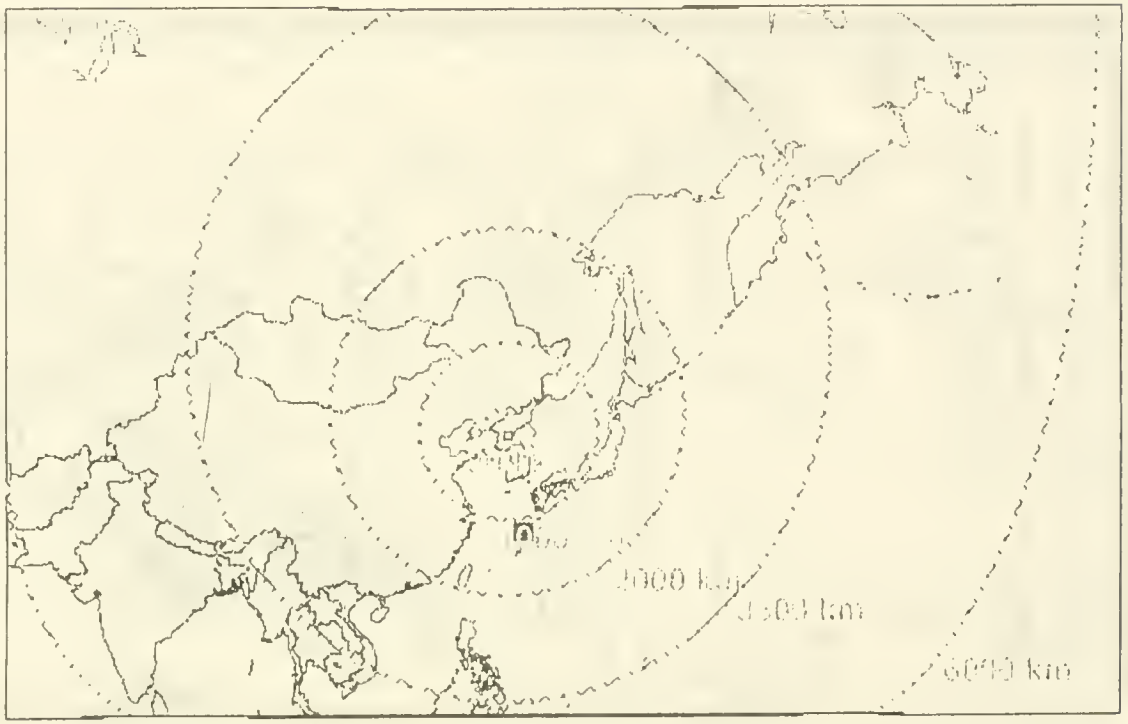


3,500 km

2,000 km

National Institute for Public Policy

DISTANCES FROM NORTH KOREA



Mr. HUNTER. Thank you, Dr. Payne.
Professor Milhollin.

STATEMENT OF GARY MILHOLLIN, DIRECTOR, WISCONSIN PROJECT ON NUCLEAR ARMS CONTROL

Dr. MILHOLLIN. Thank you, Mr. Hunter. I am delighted of course to be here, as I have been here before. I guess I should say as I have been delighted to work with the committee before.

I am particularly interested in sort of covering some of the basics on the spread of nuclear weapons, which the committee has asked me to do, and, in particular, the committee has asked me to comment on the administration's response to the spread of nuclear weapons.

I think there are two things that we need to do. We need to give nonproliferation a high priority diplomatically and economically, and we need to have a consistent policy, and I am afraid I must say I don't think we have either at this time.

The cold war produced a very unusual climate in which nuclear weapons grew up. Things were predictable, relatively speaking, during the cold war period. You could have models of deterrence, models of flexible response; you could work out theories in which nuclear weapons would be used or controlled with a fair amount of confidence. There were only two actors in the drama. Each actor could watch the other, and you could be fairly sure how the other guy was going to respond to what you did. But today the United States and Russia no longer target each other with nuclear weapons. The risk that thousands of nuclear weapons are going to destroy civilization has gone way down, but I think the risk that a few nuclear weapons could go off in cities is going up.

Instead of the bipolar cold war world, we are now facing a world that look that looks more like 1939 or 1914 in which a number of countries may or may not have certain capabilities, may be aligned with other countries, and in which regional conflicts can break out in unexpected places. I think it might be well for me just to sort of give you a world tour of what I see in terms of trouble spots.

I think the risk of nuclear war now is probably greatest in South Asia. India and Pakistan can each deploy on very short notice a small arsenal of from, I would say, one to a few dozen nuclear weapons. They also have a border conflict and a tradition of mutual hostility. That border conflict could get out of hand at any time. They are both also building nuclear-capable missiles which will destabilize the situation even further if the missiles are deployed. Right now the question is whether India will actually deploy a short-range, nuclear-capable missile or whether it will go into serial production, which for the Pakistanis is the same thing as deployment, because if you are producing a mobile missile in great quantities you don't know where it is. That is really the issue right now that the United States and India are talking about very seriously, is the deployment of a short-range missile called the Prithvi.

I have provided the subcommittee with copies of a new publication that my project has just launched called the "Risk Report." The first two issues of the "Risk Report" describe India's nuclear program and missile program, and for the first time it lists the companies in India that are actually contributing to the production

of plutonium outside international inspection and contributing to the construction of missiles and rockets.

Mr. HUNTER. Professor Milhollin, if you will suspend for 1 minute, let me just recommend to the members the "Risk Report" which Professor Milhollin just referred to. We will make sure that all members have copies of those, and we will put these in the record. I think it is an excellent publication.

[The "Risk Report" can be obtained from the Wisconsin Project on Nuclear Arms Control, 1701 K Street, NW., suite 805, Washington, DC.]

Dr. MILHOLLIN. Thank you.

I should say that the lists of companies are designed to help exporters avoid making dangerous sales. That is the main reason for publishing the list of exporters, and I might say that so far the U.S. Government has refused to do that. I am referring to Mr. Weldon's comment that we seem to have trouble getting information out of the Government. The Government knows who these people are but won't say. We have decided to say.

Going on to North Korea, I think we can see that in North Korea things are still unsettled. The North Koreans are saying that they want light water reactors from someone other than South Korea, and we are saying that that is impossible. I think the agreement will become unraveled unless somebody caves. Our diplomats predict that the North Koreans will cave, and I think we will just have to wait and see what happens.

There are, however, implications from the North Korean agreement that are settled. First, the first implication is that the administration has agreed North Korea can keep any bombs it may have made while breaking the nonproliferation treaty; and, second, the administration has agreed to basically put North Korea on life support with oil shipments as a reward for not making any more bombs in violation of the nonproliferation treaty. All of this will happen while North Korea continues to build up its military force on the border and develops long-range, nuclear-capable missiles for export to the Middle East.

I recently had a conversation with a Russian diplomat about Russia's sale of light-water reactors to Iran. He was defending Russia's decision, and he said he couldn't understand why the United States objected to it. He said whenever the Americans want to sell something it's good, but whenever the Russians want to sell something it's bad, and he pointed out that North Korea is in open violation of the nonproliferation treaty and will be for the next 5 years while we actually supply billions of dollars' worth of free construction for these reactors, whereas Iran is still a member in good standing of the nonproliferation treaty.

So I think his conversation made it clear to me that you can't have policies in one part of the world without considering what effect they will have in some other part of the world, and that is why I think that the administration policies now are not consistent. That is one reason.

Second, with respect to Iran we have problems. We are trying to convince other countries to join with us in isolating Iran diplomatically and technologically. The difficulty is, we aren't giving other countries the kind of evidence they need to take that step. The CIA

keeps saying that the Iranians are building the bomb, but they don't put out the evidence. If you want to convince other countries not to make sales, you have to put out the evidence, and, if I might, I will give you an example.

During the eighties the United States knew that—that is, our intelligence agencies knew that German companies and German brokers were doing the following, building a poison gas plant in Libya, equipping Iraq with a poison gas manufacturing infrastructure, sending to both India and Pakistan the means to escape Western controls and make nuclear weapon material when neither country belonged to the NPT, and Germany was also helping Brazil with its nuclear program.

The U.S. intelligence agencies knew all this was happening. We sent Germany demarches, which Richard Perle has called "demarshmallows." The Germans literally—I have been told by German officials, literally threw them in the wastebasket. I have copies of those demarches.

Nothing happened to Germany's behavior until the United States Government decided to put it out into the media. That happened about January 1, I think, of 1989. At that time the Germans denied it. We put out more information, and finally the Germans had to admit that they had a problem. Chancellor Kohl was undermined politically, but it happened, and Germany actually changed its export laws, and German laws are now some of the strongest in Europe, but none of that was possible until the information hit the streets.

So if you want to deal with Iran successfully today and if Iran is making the bomb, then it is up to us to put the information out so that the world can act on it, and so far we are not doing it.

The next topic I'll take up is the nonproliferation treaty. As members of the committee probably know, it is up for renewal next month and the vote count is close. Mexico and Egypt are leading the opposition to an indefinite extension which the United States wants. When the United States decided to bail out Mexico recently, we did not receive any commitment from Mexico to diminish or cease its opposition to an extension of the treaty indefinitely. We had a big opportunity, and we did not take advantage of it. If the treaty is as important to the administration as the administration says, it seems to me that we might have asked Mexico for a little help since we gave Mexico a lot of help, but apparently that didn't happen. There was a demarche in the process, but the decision was made so rapidly that the demarche never had a chance to go anywhere.

Egypt is concerned about Israel. Israel is estimated to have between 100 and 200 nuclear weapons and seems to be building more as we speak. Israel also has a big missile that can deliver those warheads throughout the Middle East. Egypt is being asked to renounce nuclear weapons forever under an indefinite extension of the treaty. Egypt wants Israel to make some small gesture in the direction of arms control. So far, Israel hasn't done so and we have not asked Israel to do so. I think that since Israel has pretty much made it in terms of nuclear weapons, that it would be prudent for Israel to make such a gesture now. It would be in Israel's interests, in our interests, and in the interests of the Middle East.

Then we have to think about Iraq. Three permanent members of the Security Council are now lobbying to get the oil embargo lifted. They may succeed eventually. If they do, the U.N. inspectors say that they, the U.N. inspectors, are convinced that Iraq will try to revive its mass destruction weapon program and try to revive the supplier network that has nourished it. The inspectors think they have a monitoring system and an export control system that can keep the risk down, but they cannot provide guarantees.

I believe that if the oil embargo is lifted we will be back to the races with Saddam, we will be back in the position we were before the war of trying to figure out what he is buying, where, and we will be back in the position basically where we are with Iran now.

If I had been giving this presentation a few years ago, I would have to cover Argentina and Brazil, but these countries are success stories, they are coming in from the cold. Argentina has joined the nonproliferation treaty, and Brazil is trying to join the Missile Technology Control Regime, which is a regime to stop the spread of long-range missiles.

I would like to urge the committee to consider that these victories were due in large part to export control. The West, the developed countries, denied Argentina and Brazil high technology as a price for those countries' commitment to nonproliferation. We made it clear to them that as long as they were going to proliferate they weren't going to get the kind of technology they wanted. That strategy works, and it can still work for other countries. But for it to work, we have to stop thinking that exports are the only way to have a successful country. We have to be willing to pay some costs.

Last session there was an effort to legislate a very weakened Export Administration Act which this committee, to its great credit, stopped. There will be another effort this session to legislate a weakened Export Control Act. I hope the committee is as resolute in this session as it was in the last session, and the Commerce Department is under a lot of pressure every day from exporters to deregulate things on its own by changing its regulations. I hope the committee will be vigilant in making sure that doesn't happen.

Finally, I would just sum up by saying we have to have a more consistent and coherent policy if we are going to stop proliferation. We can't make deals with North Korea that undermine us in the Middle East. We can't get the nonproliferation treaty renewed on the terms we want unless we are going to pressure countries to support it, and we cannot stop the spread of dangerous technology if we are going to undermine our export controls.

We hear lots of speeches about proliferation, but what we really need is more coherent and consistent action.

Thank you.

WISCONSIN PROJECT ON NUCLEAR ARMS CONTROL

Prepared Statement of
Gary Milhollin

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and
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Before the Subcommittees on Military Procurement
and on Research and Development
Committee on National Security
United States House of Representatives

March 15, 1995

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I am pleased to appear here today to discuss the threat posed by the proliferation of weapons of mass destruction. I am a member of the University of Wisconsin law faculty and I direct a research project here in Washington devoted to tracking and inhibiting the spread of nuclear and chemical weapons and the missiles to deliver them.

The Subcommittees have asked me to comment on the current U.S. response to the proliferation threat. I believe that for U.S. policy to succeed, it needs to be consistent and it needs to give nonproliferation a high priority. In fact, it is failing on both counts.

I would like to begin by pointing out that nuclear weapons have grown up in an unusual political climate. The cold war created a bi-polar world in which things were fairly predictable. It was possible to work out elaborate models of deterrence, or of "flexible response," in a controlled atmosphere. There were only two main actors in the nuclear drama. Each could watch the other, and be fairly confident how the roles would be played.

Today, Russia and the United States no longer target each other with nuclear weapons. Both countries are committed to drastic reductions in their arsenals. The risk that thousands of nuclear weapons will obliterate civilization has gone down. But the risk that a few nuclear weapons will obliterate a few cities is probably going up. The cold war's stability is being replaced with the instability that shook the worlds of 1914 and 1939. One doesn't know where the next local conflict will break out, who will back whom, or with what arms.

The chances of nuclear war are probably greatest in South Asia. India and Pakistan can each deploy a small arsenal of one dozen to a few dozen atomic bombs. They also have a border conflict and a tradition of mutual hostility. These ingredients create a potentially explosive mix. Both countries are also building nuclear-capable missiles, which will destabilize things even further if the missiles are deployed.

I have provided the Subcommittees with copies of a new publication that my project has just launched, called the Risk Report. The first two issues cover India's nuclear and missile programs. They contain unclassified lists of the Indian companies that are building India's rockets and missiles, and helping produce

plutonium free for use in atomic bombs. There are also lists of the sensitive products India is trying to import on the world market. The Subcommittees may wish to include these two issues in the record of this hearing. The lists are designed to help exporters avoid risky buyers.

In North Korea, the situation is still unsettled. The agreement made last October will probably unravel if North Korea insists on receiving light water reactors from some country other than South Korea--unless the United States caves on that point. The administration and the South Korean government are predicting that North Korea will cave.

What is settled, however, is that the accord is creating problems for U.S. nonproliferation policy. The Clinton administration has agreed to let North Korea keep any bombs it may have made while breaching the Nuclear Nonproliferation Treaty. The CIA says the number of bombs could be one or two. The administration has also agreed to give North Korea four billion dollars' worth of light water reactors, and to supply millions of dollars' worth of oil over the next ten years to reward North Korea for not making any more bombs. All of this will happen while North Korea builds up its powerful army on the South Korean border and develops missiles for sale to the Middle East.

I spoke recently with a Russian diplomat about the North Korean agreement. He was defending Russia's decision to sell light water reactors to Iran. He said he thought it was absurd for the United States to object. "Whenever the Americans want to sell something it is good," he said, "but whenever the Russians want to sell something it is bad." It was hard to contradict him. Iran is a member in good standing of the Nonproliferation Treaty; North Korea is openly breaching it. In fact, North Korea will remain in breach while American taxpayers put North Korea's economy on life support with oil shipments and while North Korea gets five or more years' worth of construction on the light water reactors.

With respect to Iran, there are problems. The United States has not been able to convince other countries of its point of view. Our intelligence agencies keep announcing that Iran is going for the bomb, but never produced any proof. If there is evidence that Iran is building nuclear weapons, and thus breaching its pledge under the Nonproliferation Treaty not to do so, it is time for these agencies to speak up. The United States needs to convince the Europeans not to sell Iran

sensitive equipment. To do that, the United States has to cough up the evidence of why they shouldn't. Unless our diplomats are willing to get specific, we are wasting time and lowering U.S. credibility.

That credibility is important as we try to extend the Nonproliferation Treaty. It is up for renewal next month and the vote count is close. Mexico and Egypt are leading the opposition to an indefinite extension. When the administration decided recently to bail out Mexico financially, it apparently did not get a pledge of Mexican support for the Treaty. It is hard to understand why the administration did not get it, if the Treaty is as important to the administration as it says.

Egypt is concerned about Israel, which is estimated to have at least a hundred and probably closer to two hundred nuclear weapons. Israel also has a large missile that can deliver nuclear warheads throughout the Middle East. Egypt has asked that Israel make at least some gesture in the direction of limiting its arsenal in exchange for Egypt's promise under the Treaty to abstain from nuclear weapons forever.

This request seems entirely reasonable. America and Russia are cutting their arsenals, and nuclear weapons are losing their luster as emblems of status. Yet, the United States has not publicly encouraged Israel to make such a gesture, and Israel has not done so.

And one cannot speak of the Middle East without considering Iraq. Russia, France and China, three of the five permanent members of the U.N. Security Council, are lobbying to lift the Iraqi oil embargo. The U.N. inspectors are convinced that if the effort succeeds, Iraq will try to revive its mass destruction war machine and the network of foreign suppliers who have nourished it. The inspectors plan to do all they can to thwart such an effort, but they cannot ensure success.

The chance that Iraq, Iran or Libya will get nuclear weapons also depends on Russia. As far as we know in the West, the former Soviet Union's nuclear warheads are still protected. The same cannot be said of its nuclear materials. The United States has helped Russia install security equipment at one site where nuclear materials were at risk, but there are scores of similar sites that do not have such

equipment. The world will be lucky if bomb quantities of fissile material do not find their way from Russia to the Middle East by the end of the decade.

If I had been making this presentation a few years ago, I would have covered Argentina and Brazil. But these countries are turning into success stories. Both have pledged to give up nuclear weapons and Brazil may join Argentina in giving up long-range missiles as well.

These victories were due in large part to export controls. Argentina and Brazil were denied high-technology exports as long as they persisted in proliferation. The same policy will still work with the remaining holdouts. However, the Commerce Department seems intent on reducing U.S. export controls as rapidly as possible, and there will be an effort during this session of Congress to legislate a weakened Export Administration Act. Last session, this Committee's bipartisan amendments blocked such an effort and preserved the U.S. national security interest in strong controls. I hope the Committee will be equally vigilant during this session. It should stop any legislative attempt to weaken existing law, and it should make sure that the Commerce Department does not weaken existing controls by unilaterally changing its regulations.

If there are going to be more victories for nonproliferation, U.S. policy must be more coherent. The administration cannot make deals with North Korea that destabilize the Middle East. It cannot make renewing the Nonproliferation Treaty a high priority without pressuring countries to vote for it. And it cannot stop the spread of dangerous technology by cutting export controls. There have been plenty of administration speeches about nonproliferation. It is time for coherent action.

Mr. HUNTER. Thank you, Professor Milhollin. As usual, you are right on point and concise, and we appreciate you.

I might remind members that we will be having closed briefings this afternoon, and I would urge everyone to come and listen to the intel community's presentation at that time.

My colleagues, the last couple of hearings that we have had, we have managed to just barely get off the top row with questions. Before we go to Dr. Bailey, let me say that we are going to do something a little bit unique. We are going to start with the gentleman whose questions were hanging fire and never got off the pad because we ran out of time last time, we are going to start at the lower dais and work up, and so after Dr. Bailey gives her statement we are going to start with Mr. Tiahrt of Kansas and then Mr. Kennedy, who I know waited for several hours last time to get his question and I think never got a chance.

So with the forbearance of my colleagues on the upper tiers, we will start with the newer members because they have been waiting the last couple of hearings to get a chance to get their oar in the water.

Dr. Bailey, thank you for being with us, and the floor is yours.

STATEMENT OF KATHLEEN BAILEY, SENIOR FELLOW, CENTER FOR SECURITY AND TECHNOLOGY STUDIES, LAWRENCE LIVERMORE NATIONAL LABORATORY

Dr. BAILEY. Thank you, Mr. Chairman and members of the subcommittees.

I am Kathleen Bailey. Although I am from Lawrence Livermore National Laboratory, the views I present today are my own and not of any other institution or of any institution.

Mr. HUNTER. I know they aren't Los Alamos' views, we are sure of that.

Dr. BAILEY. I have been working the issue of proliferation and nonproliferation since 1976. Let me give you the punch line of my testimony today. Chemical and biological weapons are both easy to make technologically, very inexpensive, and efforts to produce them cannot be detected necessarily with today's technical means. Let me explain.

Chemical weapons, classical chemical weapons, are World War I, not World War II, World War I technology. The processes for chemical agents are available in the open literature, and the equipment required to manufacture these chemical agents is the same equipment as is needed for common industrial processes. You can buy used equipment from the back of chemical industrial magazines and use that equipment, delivered via mail, to manufacture chemical agents.

They are also very inexpensive. For example, a small plant to produce phosgene would cost only approximately $2 million to build. The problem of finding a clandestine facility is greatly complicated by the fact it can be very small. For example, a 100-ton-per-year facility could fit in a space 40 feet by 40 feet. The building in which this is housed could be put under ground or in some unsuspecting place. It could not necessarily be detected by any means because it need not have any distinguishing features.

Export controls cannot prevent chemical weapons proliferation. The Australia Group, for example, can put controls on chemicals, yes, but countries can simply turn to indigenous production of those chemicals, as Iraq was doing at the time of Desert Storm. And with regard to the point of whether or not we can verify a ban on chemical weapons, let me just cite to you former CIA Director Woolsey's statement last year. "I cannot state that we have high confidence in our ability to detect noncompliance with this treaty"—meaning the chemical weapons ban—"especially noncompliance on a small scale." I think that sums it up very well.

Even though the chemical weapons proliferation issue is an extremely serious one, it is my assessment that the biological weapons proliferation problem is much more serious. It is more serious not only because these weapons are even easier and less expensive to make than chemical but because their mass destructive capability is so much more profound.

Once a chemical agent is used—sorry—once a biological agent is used, it is out there in the environment and it can spread just like your common influenza virus can from person to person. You also know that, like influenza viruses, mutation can occur, making the disease even more virulent as it travels from person to person, community to community. Thus the BW threat is something to really worry about deeply.

Very few people would be needed to manufacture biological agents. Iraq's program reportedly had only a handful of people working on it, but I have interviewed microbiologists at universities who have told me that a single person could produce small quantities of a BW agent for use as a weapon either as a terror weapon or for someone, a country, to use as its own.

The equipment and technology and the infrastructure is exactly the same as required for medical and pharmaceutical research. You can't put controls on things for medicine because it is for the betterment of mankind. Well, the same technology, the same equipment, and the same expertise is usable for weapons purposes. Also, I would mention that it is extremely inexpensive. The pathogens that can be used for weapons are in the environment and can be manufactured in large quantities.

The Biological and Toxin Weapons Convention of 1972 was intended to put a stop to the BW proliferation problem, and it has helped establish a norm against BW proliferation, but it is not a verifiable regime. That was recognized in 1972 when the agreement was drafted. In the future, control of biological agents will become even more difficult, and the reason for this is that advances will continue in genetic engineering. Let me just mention one example of the problem.

If you grow a pathogen in, let's say, a medium that contains the antibiotic that we would today use in the West to control the disease caused by that pathogen, then you can create a monster, so to speak. You can create a disease for which there is no antibiotic treatment known. Well, Russia has done that. They have cultivated their BW agents in antibiotics.

Let me turn briefly to the military utility of these weapons, because sometimes people say, well, yes, these things are easy to make, but they are not easy to use. That is definitely wrong. Imag-

ine for the moment if, during Desert Storm, Iraq had lobbed one, two, or even five BW- or CW-agent-filled weapons, artillery shells perhaps, over a Western encampment. Only a few weapons so equipped would have caused the Western alliance to have to suit up. Now donning protective gear against chemical and biological agents can be an end in itself in a battle because protective suits, they cause claustrophobia, they inhibit movement, make performance of tasks difficult, they cause a psychological reaction in the troops that are forced to don them. So there is very definitely military utility even to using only a few rounds of such agents.

Today I think that the delivery of chemical and biological agents is made even easier than it was simply 5 years ago by the possibility that countries may use cruise missiles. Now I realize that most people are more concerned about the ballistic missile question because that has been in the forefront of the news and it is something that is an extreme worry, no question about it, but cruise missiles—now don't think Tomahawks here, I'm not talking about something that is very sophisticated, ground hugging, and knows the terrain, and costs $1.5 million a copy, I'm talking about something that can be as cheap as $10,000 a copy. We are talking about small-frame aircraft or remotely piloted vehicles here. They are lightweight, you can send them on a one-way mission equipped with a very light warhead. What is light? Chemical and biological agents are both light.

So the delivery is more feasible today than it was in the past via cruise missile because of the advent of technologies like global positioning system [GPS], global positioning system. This enables a country to go to the Radio Shack equivalent somewhere, buy a GPS receiver for hundreds or a couple of thousand dollars, put them in the remotely-piloted vehicle or airframe, and get that vehicle to its target within 100 meters or less. That is very accurate.

One final note on the cruise missile problem. We talk about ballistic missiles, and people say, well, it can't reach the U.S. mainland. Well, cruise missiles launched from a seaborne platform can reach the U.S. mainland, so weapons of mass destruction can technically be delivered against the U.S. mainland today if a country chose to do so using a cruise missile.

Allow me to end there. Thank you, Mr. Chairman.

Statement

By

Dr. Kathleen C. Bailey

Before the

US House of Representatives
Committee on National Security

Subcommittee on Military Procurement
and
Subcommittee on Military Research & Development

March 15, 1995

Mr. Chairman, Members of the Subcommittees, I am very pleased to appear before you today to address the subject of chemical and biological weapons proliferation. I am Kathleen Bailey and currently am a senior fellow at Lawrence Livermore National Laboratory. The majority of my professional career has been devoted to study of the proliferation of weapons of mass destruction and delivery vehicles. I have served the United States Government in the Arms Control and Disarmament Agency, the Department of State, and the US Information Agency. My remarks today represent my own views and do not necessarily represent those of the Lawrence Livermore National Laboratory, the University of California, or any agency of the United States Government.

Chemical Weapons Proliferation

Chemical agents are relatively simple to make and are technologically within reach of over 125 countries. The processes to make chemical compounds used in classical agents—those known and used since WW I— are well-documented in unclassified literature. The equipment necessary can be purchased readily on the open market, and is the same as that required for a host of other chemical-industrial activities. Furthermore, chemical agent production can be relatively inexpensive. A small plant to make phosgene, for example, would cost only about $2,000,000.

Although there is clear evidence that some nations—such as Libya, Iran, and Iraq—have made chemical weapons (CW), there is no way of knowing how many countries actually have CW. A chemical agent production facility is relatively easy to hide: it can be small (a 100-ton facility can be as small as 40 ft. by 40 ft.) and without physical features that would distinguish it. Although on-site inspection of a plant *might* reveal the fact that CW agent is being produced, there are currently no technical means to locate such a plant in the first place. In other words, the only way to find a well-hidden CW facility is to acquire accurate human-source intelligence about it.

Two principal nonproliferation policies intended to limit the spread of chemical weapons are export controls (the Australia Group) and the Chemical Weapons Convention (CWC). Neither have been nor can be effective in stopping proliferation. Export controls can slow the acquisition of CW capability by some nations by preventing their ready import of the requisite chemical compounds. However, any nation dedicated to acquiring CW can either develop its own indigenous production capabilities, just as Iraq was doing at the time of Desert Storm, or can turn to nations that do not rigorously apply export controls.

The effectiveness of the Chemical Weapons Convention vis-a-vis proliferation is similarly limited. Former CIA Director Woolsey, who testified during the US Senate ratification hearings on the CWC last year, said, "I cannot state that we

have high confidence in our ability to detect noncompliance with this treaty, especially noncompliance on a small scale." There are simply too many ways for a nation to cheat with little or no risk of getting caught.

Biological Proliferation

Biological weapons are a terrifying threat not only because they can cause unimaginable human suffering and death, but because they cannot be controlled once used. Diseases used as weapons can spread readily. They may even mutate and become more virulent.

While BW are in many respects the most fearsome weapon of mass destruction, they are also the easiest and least costly to manufacture. A well-trained microbiologist could himself or herself make BW agents, although a more likely scenario—as in the case of Iraq—is that a few people will be involved. The raw materials, pathogens, are found in nature. The equipment and skills needed are exactly the same as those needed for medical or pharmaceutical research, and no highly specialized equipment or materials are required. The facility can be nothing more than a room, and there may be no features that would distinguish it. As in the case of CW production, on-site inspection might reveal that BW agents are being made, but there are no current technologies that would enable one to find a clandestine facility, absent accurate human-source intelligence. Thus, there is no way of knowing how many countries have BW stockpiles or production facilities.

The BW problem is highlighted by Iraq. Iraq produced *Bacillus anthracis* (anthrax) in 1-liter quantities using manual techniques and flasks. It produced *Clostridium botulinum* and its toxin in 7- and 14-liter fermenters. Even though UN Special Commission inspectors have been present in Iraq since Desert Storm, they have been unable to determine if Iraq still has stockpiles of BW, or whether it has hidden BW-related capabilities. And, there is no doubt that Iraq retains the expertise and capability to resume BW production immediately if it were to make a decision to do so.

When the Biological and Toxin Weapons Convention (BTWC) of 1972 was drafted, it was widely recognized that verification is impossible. Nevertheless, there have been subsequent efforts by arms control advocates to "strengthen" the BTWC by adding an inspections regime similar to that envisioned for the CWC. Experts recognize, however, that such measures will provide little, if any, confidence that cheating is not taking place. Arms control, unfortunately, will not solve the problem of BW proliferation.

In the future, the BW proliferation problem will be unavoidably exacerbated by advances in technologies for medicine and biotechnology, which will enable pathogens to be made more effective as weapons. For example, a virus may be

made to circumvent any immunities to its "conventional" strain, or a bacteria may be made resistant to antibiotics (as Russia has reportedly done[1]).

Military Utility

The chemical or biological weapons arsenals of opponents need not be large to constitute an extremely serious threat to the United States, its allies, and interests. There are credible scenarios in which only tens of tons of CW agent might be used with highly significant effect, and BW are the most lethal weapon per unit of weight known.

Imagine that Iraq had fired chemical rounds at camps in Saudi Arabia during the Desert Shield build-up. It could have resulted in melting the resolve of the coalition, perhaps even breaking it up. Or, imagine Iraq had sporadically fired a few rounds containing chemical agent during the start of Desert Storm. Even if only one out of every several rounds had been chemical, it would likely have resulted in forcing troops to suit up and remain in their protective gear.

Making the enemy don protective masks and clothing can be an end in itself; the objective need not be actual casualties. It is well known that chemical gear is hot, causes claustrophobia, inhibits communication, limits sight, and can make execution of tasks difficult.

The same sort of arguments can be made about BW. Their use could have tremendous psychological impact, and can force the donning of protective masks.

Saddam Hussein—and other third world leaders as well—probably learned from the experience of Desert Storm that, to defeat the United States, one cannot hope to succeed with conventional weapons alone. In any future confrontation involving US troops against a leader like Saddam, it should be expected that he will use chemical or biological weapons either to fulfill a military objective or to undermine US public support for intervention. Just because our own leaders do not view CBW as usable does not mean that the leaders of other countries will view them similarly.

Delivery of CBW

Ballistic missiles are the most commonly mentioned delivery vehicles for chemical or biological warheads not only because they can carry payloads to great distances, but because such warheads can "make up" for the relative inaccuracy of most Third World missiles. Indeed, Saddam Hussein had chemical warheads for his Scuds.

Cruise missiles are of equal or greater utility as delivery vehicles for CBW warheads. Unlike ballistic missiles, cruise missiles can fly relatively slowly and

close to the ground, making delivery easier. Also, the technology for cruise missiles is easier than ballistic missiles in many respects.

At least 40 non-Western countries possess or have the capability to make cruise missiles. And, they are likely to become increasingly widespread because the technology to make cruise missiles has become less expensive and easier to acquire. In the past, guidance has served as a central obstacle to the proliferation of such missiles because sophisticated, expensive technologies were needed to map terrain and guide the missile over obstacles to the target. Today, proliferants have a much easier time acquiring guidance technology. Inertial navigation systems for aircraft are commercially available and can be used in cruise missiles. Also, the advent of satellite positioning systems allow a missile to "know" its position to an accuracy of 100 meters or better.[2]

Third World cruise missiles need not be as sophisticated as US Tomahawks; they can be converted unmanned aerial vehicles or may be fashioned from small aircraft or "airplane kits," the latter costing as little as $10,000. Countries capable of manufacturing aircraft are also technically capable of manufacturing cruise missiles. At least six Third World countries currently manufacture supersonic aircraft[3] and a number of others produce light attack planes and trainers. These countries do not need to use sophisticated engines; simple turbojet engines—like those built by Brazil for its remotely piloted vehicles in the early 1980s—will suffice for short-range cruise missiles. At least 15 countries in the Third World presently are capable of producing cruise missiles. Some may even be willing to sell or give them to other countries.

Cruise missiles present a particular danger to the United States because, unlike the current threat from Third World ballistic missiles, they could be launched from sea platforms to reach the continental United States. And, the capabilities of cruise missiles to penetrate air defenses are enhanced by the increasingly wide availability of radar absorbing materials which make missiles more stealthy, as well as the exceedingly slow flight of some cruise missiles, which limits their dectectability.

Deterrence

If other countries do acquire chemical weapons with the intent to use them against the United States or its allies, do we have an effective deterrent? To be effective, a deterrent must be viewed by the opponent as both credible and unbearable.

One problem with using conventional weapons to deter CBW use is that they are perceived as less terrible, and thus have less deterrent value. Another is that large-scale conventional retaliation may be stymied by logistical problems, time required, expense (in terms of lives lost as well as money), and use of effective countermeasures by the opponent. In fact, by threatening to use weapons of

mass destruction against any US troops that may be sent to the region, proliferants can substantially reduce the likelihood that the United States will be willing to engage in conventional reprisal.

When the Bush Administration was preparing to announce its unilateral renunciation of chemical weapons, it was recognized that conventional force might not be effective in deterring chemical weapons use by others. A view held by some top officials was that the US nuclear deterrent would be relied upon.

There are serious problems with the notion of nuclear deterrence as well. The question of proportionality must be considered carefully, as must the implications of using nuclear weapons to deter anything but nuclear weapons. And, current US policy is to not use nuclear weapons against any nation that is a member of a nuclear nonproliferation treaty and is not in alliance with a nuclear weapon state. In short, the issue of how the United States should effectively deter CBW has not been well addressed.

Conclusion

Nonproliferation policies to limit the spread of missiles and warheads of mass destruction hamper nations pursuing such deadly weapons, but do not stop them. Proliferation continues and that the United States and its allies are likely to face increasingly severe threats from hostile nations in possession of CBW warheads and the missiles to deliver them.

Given that nonproliferation policies cannot stop a determined proliferator, it is imperative that the United States prepare to counter the threats it may face. Central features of US preparations should include: effective ballistic missile and air defenses; capable detectors with rapid response to determine the presence or use of CBW; counterproliferation measures to destroy CBW stockpiles at their origin; and, better protective measures such as vaccines, antidotes, and prophylactics.

Additionally, the question of how best to deter the use of CBW must be addressed. The United States has forsworn in-kind retaliation against use of chemical or biological weapons, leaving only the options of conventional or nuclear retaliation. Yet, there may be cases in which a conventional response is impractical. Alternatively, today's nuclear capabilities may not be structured to respond appropriately and proportionally to a CBW attack. These questions should be thoroughly vetted *before* the proliferation problem worsens.

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[1]Vladimir Pasechnik, a senior biologist who defected to Britain in 1989, appeared on the BBC's "Newsnight" program and stated that Russian scientists cultivated bacteria in containers of antibiotics to make them resistant to treatment. See Bill Gertz, "Russia Has Biological Weapons, Defector Says," *The Washington Times*, January 22, 1993, p. A9.

[2]A proliferant using differential GPS—GPS corrected for error introduced by selective availability—may achieve accuracy of 10 meters. See Irving Lachow, "The Global Positioning System and Cruise Missile Proliferation: Assessing the Threat," CSIA Discussion Paper 94-04, Harvard University, June, 1994, p. 7.

[3]India, Israel, North Korea, South Africa, South Korea, and Taiwan.

Selected Weapons Programs

Nuclear	Biological	Chemical	Missile: Ballistic	Missile: Cruise
India	**Egypt**	**Chile**	**India**	**Argentina**
Israel	Iran	**Egypt**	**Iran**	**Brazil**
Pakistan	Libya	**India**	**Iraq**	**Egypt**
Iran	N. Korea	**Iran**	**Israel**	**India**
N. Korea	Pakistan	**Iraq**	**N. Korea**	**Iran**
Argentina	Taiwan	**Israel**	**Saudi Arabia**	**Iraq**
Brazil	*India*	**Libya**	**S. Africa**	**Israel**
S. Korea	*Iraq*	**Syria**	**Syria**	**N. Korea**
Taiwan	*Israel*	N. Korea	Brazil	**S. Africa**
	S. Korea	Pakistan	Egypt	**S. Korea**
		Taiwan	Libya	**Taiwan**
			Pakistan	**Indonesia**
			S. Korea	**Chile**
			Taiwan	*Singapore*
			Argentina	

Have/have had weapons

Have program

Have significant capability

Sources: "Russian Intelligence Report on Proliferation" (translated by Foreign Broadcast Information Service, February 24, 1993); Testimony of CIA Director James Woolsey before the Senate Governmental Affairs Committee, February 24, 1993; and Seth Carus, Cruise Missile Proliferation in the 1990s (Westport, Conn.: Praeger, 1992), appendices.

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Cruise Missiles Worldwide

Cruise missiles can be sophisticated, like the US Tomahawk, or simple, such as a weaponized remotely piloted vehicle (RPV). Virtually any country in the world can acquire a simple aircraft and use it as a cruise missile. The more important question is: how many countries have purchased cruise missiles or can manufacture RPVs, or aircraft, which can be used as cruise missiles? Other than the advanced industrial countries, the list includes at least forty countries[1]:

Non-Western Countries Capable of Producing Cruise Missiles

Argentina
Brazil
Chile
China
Egypt
India
Indonesia
Iran
Iraq
Israel
North Korea[2]
Saudi Arabia
Singapore
South Africa
South Korea
Taiwan

Countries With Purchased Cruise Missiles

Angola
Bahrain
Bangladesh
Brunei
Bulgaria
Cameroon
Colombia
Cuba
Ecuador
EthiopiaGreece
Kenya
Kuwait
Malaysia
Morocco
Nigeria
Oman
Pakistan
Peru
Poland
Qatar
Romania
Somalia
Syria
Thailand
Tunisia
Turkey
United Arab Emirates
Venezuela
Vietnam
Yemen
Yugoslavia

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[1]The information in these tables was drawn from Seth Carus, *Cruise Missile Proliferation in the 1990s* (Praeger, 1992)

[2]North Korea is not in the Carus book, but reportedly has produced short-range cruise missiles.

Mr. ABERCROMBIE. Mr. Chairman.

Mr. HUNTER. Yes, the gentleman is recognized.

Mr. ABERCROMBIE. I wonder if we could just cancel the hearing and maybe have Dr. Bailey take us on a nature walk or something right now.

Mr. HUNTER. Our job is to inform members, and sometimes that's scary.

But, Dr. Bailey, you have laid out a very formidable but factual presentation. I think it is right in line with the facts that Professor Milhollin and Dr. Payne have stated, kind of a grim assessment but one that is very important that you make.

We are now going to stay with this to allow our newer members to have a chance to ask a question—some questions here early on. We are going to start with Mr. Tiahrt of Kansas, and we will be going to Mr. Kennedy of Massachusetts—or, excuse me—Rhode Island—excuse me, Mr. Kennedy; and then Mr. Thornberry of Texas.

Mr. Tiahrt.

Mr. TIAHRT. Thank you, Mr. Chairman.

I appreciate your acknowledging us down here on the front row. I was beginning to wonder if these microphones actually worked.

I noticed that in this chart, Dr. Bailey, I just started connecting some of these countries that go across from nuclear, biological, chemical, then the delivery systems of a ballistic and cruise missile, and then noticing what neighborhood these countries lie in, and it looks like India and Pakistan have similar capabilities and they are closely linked geographically adjacent to each other; Israel, Iran, Egypt, some other countries that have some close alliances physically; and those seem to be the neighborhoods that are more in danger.

But as you point out so aptly, cruise missiles could be delivered from a seaborne vessel, which could be within 10 miles of our shore or 2 miles of our shore, very close. If these missiles are readily available and easily delivered, what would be the logical conclusion for defense policy for these types of weapons, undetectable, easily made, easily delivered?

Dr. BAILEY. The question you ask is a very difficult one because to answer it properly I would need to be able to tell you exactly which technologies we should be developing to be able to defend against these missiles. But let me give you the short, comprehensive answer which would be, I think that we need to focus much more carefully than we have on defenses against cruise missiles, air defenses.

Now I acknowledge that the ballistic missile problem and the theater ballistic problem is one that persists and is terribly worrying, but we need to expand the focus. Right now, for example, the organization in the Pentagon that is responsible for missile defense is the Ballistic Missile Defense Organization. Again, the focus is on ballistic. We should broaden the scope and think about technologies in a much more broad-brushed way to include cruise missiles. I think that that office ought to be the missile defense organization, not the Ballistic Missile Defense Organization.

Mr. TIAHRT. Dr. Payne, in our Institute for Public Policy, have you developed a policy on this missile defense that we are looking

at, not just ballistic missile but, as Dr. Bailey points out, missile defense, and developed a policy or thought it through?

Mr. PAYNE. Well, the recommendations that we have put forward—and it maybe would echo the points that Dr. Bailey just made, and that is that both ballistic missiles and cruise missiles pose a threat including a threat to the United States, probably during this decade, certainly soon thereafter, and that active defense measures need to be mounted against both types of platforms because we are likely to see both types of platforms.

Mr. TIAHRT. Over the last couple of years we have dropped some of the barriers that we had on exporting computer technology, high-speed processors, and we have exported computers that have the capability of improving guidance systems for long-range missiles, theater missiles, possibly even intercontinental. Is there evidence that our policy, or any evidence that you know of, of our policy of lowering these standards as far as what we keep from exporting on computers has been used to develop guidance systems that you know of, or has there been any talk about the dangers that we have put worldwide by selling these type of high-speed processors?

Mr. PAYNE. I'm not aware of that, no.

Dr. BAILEY. Could I just address that point? When I worked in the Arms Control and Disarmament Agency as Assistant Director during the Reagan administration, I was in a position that was responsible for looking at whether or not we should increase computer sales particularly, and the concern was that they would be used in proliferation activities, and in my look at it I think that the progress made in worldwide production of computers has been so great and the uses that they have expanded so much that actually the argument for export controls on computer-related things was undermined, and I ultimately switched my position and said that, yes, we should begin to make more exports for the primary reason that these computers were available from multiple sources; and, second, that they were not essential to many of the operations we were selling them for; and, third, we could provide some oversight for those computers. In other words, allowing our people to go in and check on how those computers were being used was actually a good intelligence advantage and a good oversight advantage for those programs.

So export controls can be used in a positive way if you make the sale and then follow up on the sale.

Mr. TIAHRT. That is an interesting argument.

Dr. MILHOLLIN. Would you like for me to address that?

Mr. TIAHRT. Please.

Dr. MILHOLLIN. What actually happened is that the United States Government refused to control chips, so we saw chips going abroad to places like Taiwan which then began to manufacture computers that were cited by United States exporters as sources of foreign availability to justify lowering export controls in the United States.

The big decontrol happened when the interagency process decided that computers should be decontrolled up to 500 [MTOPS] million theoretical operations per second. The only study that existed at the time that was done of foreign availability indicated that there might have been foreign availability at something like

67. In fact, this was a decision made to facilitate U.S. commerce primarily, and I don't think there has been a careful study of the defense implications of that decision.

Mr. TIAHRT. Thank you, Mr. Chairman. I appreciate the opportunity to ask questions.

Mr. HUNTER. I thank the gentleman for his excellent questions. Mr. Kennedy.

Mr. KENNEDY. Thank you, Mr. Chairman.

I would like to ask the panel, in light of Dr. Bailey's compelling testimony, which of the weapons of mass destruction—chemical, biological, or nuclear—do you see as posing the greatest threat or the most immediate threat, and distinguish that in two parts: One, to our troops deployed overseas; and then, two, to the continental United States. I take it Dr. Bailey would, from her testimony, have biological as No. 1 because it is the cheapest and easiest to——

Dr. BAILEY. Yes, I would.

Mr. KENNEDY. But I would ask the other members of the panel.

Dr. MILHOLLIN. I think it depends on what using this particular weapon is trying to achieve. If you are trying to achieve blackmail or you are trying to make a political statement, history has shown that persons who are interested in that prefer large explosions for some reason; they seem to make the headlines.

I suppose that if you were considering killing the maximum number of people in the World Trade Center you might have started a fire or—I mean there are more insidious ways of killing lots of people than big explosions, but big explosions seem to be preferred. So I do worry about using nuclear weapons for blackmail or simply a random punishment.

The nice thing about an atomic bomb going off that nobody knows who put there is that there is no evidence, there is just a big hole in the ground, and historically the fear of deterrence and retaliation has been very important to the decisions of people to do this sort of thing, and so I think what we have to expect is that anyone who is going to inflict a large amount of harm of the United States, in particular, which has the means to retaliate, is going to want anonymity, and that is going to influence the kind of weapons that is chosen.

I would like to wind up by saying our troops in Saudi Arabia during the gulf war were actually killed by a missile that was—the range of which was extended through imports—their exports, Western imports to Iraq. So we are not just talking about a hypothetical here, I mean it has happened already.

Dr. PAYNE. The problem with nuclear weapons and the difficulties they present in terms of the greatest threat or the most immediate threat is that nuclear weapons are extraordinarily useful for coercion and deterrence, and for those purposes you don't want them to go off, you don't want large explosions, you want them as a withheld threat.

Mr. KENNEDY. What do you think of the scenario that Dr. Bailey painted of the massive ability to develop these biological weapons and deploy them very easily through the use of current technology?

Dr. PAYNE. It is very realistic, and it is very sobering, but if you go back and, in fact, in some ways, not to make things worse, but I think it is almost worse than what Kathleen presented, because

if you look at what kind of policies the United States can take in response—and this gets back to your question about the greatest threat or the most immediate threat—clearly the most immediate threat, I believe, comes from chemical weapons simply because they are—according to open information, there are a lot more possessors of chemical weapons, they are very easy to make, and they are more widespread. The greatest threat is probably going to be biological and nuclear weapons. They may be somewhat further in the future.

But the question is, what does the United States do about this, and if you see deterrence as the primary tool that we have, we have made declarations with regard to nuclear weapons and our own nuclear deterrent, for example, not to use a nuclear deterrent against conventional and biological—chemical and biological weapons and conventional weapons, which means in a sense we are reserving the nuclear deterrent for the nuclear threat.

Mr. KENNEDY. What is our deterrence to biological weapons then?

Dr. PAYNE. Well, that is exactly the question I am posing. Does that mean that we are forced to rely on conventional weapons as a deterrent to a chemical and biological threat?

Mr. KENNEDY. Thank you.

Maybe I could ask Dr. Bailey. Could you paint a scenario of the use of biological weapons, because most of us are aware of nuclear, we have a picture in our mind of a nuclear weapon, but a chemical and biological weapon I think most of us aren't as familiar with even though the technology to deploy them seems to be widespread. Why hasn't it been used before in theater conflicts—to the extent that you can comment on that. And then, would you just paint a picture specifically of the possible use of this.

Dr. BAILEY. That is a very good question.

Chemical weapons were probably considered by Saddam Hussein, but he decided not to use them. He had used them against Iran and against his own people later, but he didn't use them against the Western Coalition, and the reason probably was the nuclear deterrent. Both Israel and the United States made it very clear that nuclear retaliation was a possibility if weapons of mass destruction were introduced during Desert Storm.

So I think that deterrence worked in that case, and that brings us back to the answer to the question that you asked Keith. The only deterrent we have against either biological or chemical weapons right now is either conventional or nuclear because we have given up both chemical and biological.

Now as for your scenario, maybe one or two weapons being fired is enough to make everybody suit up, we have the ability right now to detect whether or not chemical and biological agents are being used. Not very fast, we can't do it very fast, but we can tell, and we can suit up. But would we be able to in all scenarios? I don't think so.

Mr. KENNEDY. But in a biological scenario, can you describe how they were deployed and what its effects would be.

Dr. BAILEY. Biological weapons can be delivered by virtually any means imaginable—bombs, artillery shells, whatever you want. The shell would contain a warhead, or bomb would contain a war-

head, which would essentially expel the biological agent in droplets, say, of two microns in size or so, and the perpetrator would try to explode it at a certain level just off of the ground so that it would be about the height of a man, where they could inhale the particles, the pathogens, and the point is usually to aerosolize it so that the individuals that you are attacking would breathe it in and would either get sick immediately, depending on the pathogen used, or get sick a little bit later, and the purpose that would be in the minds probably of a country that would use biological weapons would be to strip the morale of the troops fighting, because it is a fairly lengthy thing. I mean you aren't going to die immediately, unless it is a toxin weapon, to terrorize the troops that you are trying to get to back off. It could also make an environment virtually uninhabitable for a certain period of time.

Mr. KENNEDY. Thank you.

Mr. HUNTER. I thank the gentleman.

Mr. Bartlett.

Mr. BARTLETT. Thank you very much.

What can you tell us in open session about the Russian chemical and biological weapons program and why, in your judgment, they are doing what they are doing?

Dr. BAILEY. The Russians have continued to work on chemical and biological weapons despite their political commitments not to do so, up to and including the Yeltsin administration. That has been openly admitted by defectors, and Yeltsin himself has made reference to the point.

Now as for your question about the reason they have been doing it, I think—you know, it is very hard to know what is in the Russian mind or any other country's minds, but to me the reason would obviously be that they want to have the capability to produce a weapon that the opponent may or may not have, and so they have worked on more lethal biological strains.

I mentioned a minute ago that they were working on some that would not be affected by western antibiotics, but they have also worked on chemical agents that would go beyond the lethality of currently known nerve agents. So they have manufactured a chemical agent that is supposedly, per unit of weight, more lethal than any chemical substance known to man.

Now most of the information beyond this is classified, so I can't comment on it publicly, but that information has been made available from the defector who gave the information to the British Broadcasting Corp. which televised it in the United Kingdom, and I got it off the videos of those.

Mr. BARTLETT. Would these be potentially export items for Russia?

Dr. BAILEY. I don't think so unless someone were able to clandestinely steal some of it in Russia and then, himself or herself, sell it on the black market. I don't think so. I don't think Russian leaders would dare let such agents out of their own hands.

Mr. BARTLETT. It is your judgment then, I gather, that that fairly aggressive program is meant for their potential use?

Dr. BAILEY. I think they intend to keep it in their own hands, yes.

Mr. BARTLETT. During the cold war a lot of credit was give to the mutual assured destruction [MAD] philosophy, the mutual assured destruction, in preventing the use of nuclear weapons. Why doesn't this same philosophy today give us reasonable assurance that we are never going to be the target of attack because they are so big and so powerful that we could totally decimate any enemy that would dare to use any of these weapons against us?

Dr. PAYNE. The policy of deterrence may have been effective during the cold war. It is difficult to prove why someone didn't take a particular move, but we might be able to assume that deterrence worked. At least it obviously didn't fail.

In the post-cold-war period, we are going to be confronted with a very different situation, multiple players involved with whom the United States would have to engage in a deterrence relationship. These players are less well understood by ourselves, other players understand us less well, we communicate less well with them, we have less appreciation of their own value structure, we are more likely to make mistakes and to misunderstand them, and they are as well of us, and what we see with regard to the historical context when threats work, when deterrence works, when deterrence doesn't work, it is most likely to work in what was in some ways the unique situation that the United States and that the Soviet Union found themselves in: Two countries watched each other very closely, compared their force capabilities very closely, communicated in fits and starts, but did have open communication channels. That is when deterrence has a chance to work. It still isn't necessarily reliable, but it has a chance to work. Absent those conditions, absent those conditions of effective communication, mutual understanding, mutual appreciation, even mutual empathy, understanding their will, their goals, their determination, deterrence is inherently unreliable, and those are the conditions that are going to prevail with many players in the post-cold-war period.

Mr. BARTLETT. Professor Milhollin, if you concur with this assessment, do you think that today the chance of some level of threat against our country is more or less than it was during the cold war?

Dr. MILHOLLIN. I guess I would say that it is about equal. I never thought that the risk even during the cold war—I never thought that the real risk from the Soviet arsenal because the bolt out of the blue—I was never convinced that that was likely to happen. I always felt that the Soviet arsenal, like all nuclear weapons, was really a proliferation risk and that the threat or the risk was loss of the control in the sense that warheads would be out in the world, and you wouldn't know who had them, and if one went off you wouldn't know who set it off. I think that is the biggest risk because in that situation deterrence doesn't work.

If a country decided to punish the United States by setting off a bomb in a U.S. city, without any threat, without any followup, I think at that point you simply fall back on your intelligence network to figure out where it came from. I mean I don't want to depress everybody, but if it took you a year to find out, as it did, say, in the Lockerbie case, would a U.S. President say a year later, "Well, the so-and-so's did it, we are now going to incinerate 50 mil-

lion people to punish them"? I just doubt whether that would happen.

So I'm afraid I don't have a good answer for you. I don't think the defense structure we built up to deter the Soviets is really adapted to the kind of threat we are facing, and I think what we need is good intelligence, we need prevention more than cure, we need to stop people from getting the bomb in the first place, and if they get it we need to have a good enough intelligence network to figure out what they are going to do with it and stop them before they get to the point where they can actually deploy it.

Mr. BARTLETT. Thank you. Thank you for all of your testimony, and thank you, Mr. Chairman.

Mr. HUNTER. Thank you, Mr. Bartlett, and I would inform members of the committee that we will continue through this vote. This is a very important motion to adjourn that is coming up.

Mr. DELLUMS. Mr. Chairman.

Mr. HUNTER. The gentleman is recognized.

Mr. DELLUMS. Thank you.

I realize that at the last hearing you attempted to continue the hearing, and there is some merit in that, but there are also some enormous disadvantages to that. I would think that one of the important responsibilities of a hearing is to allow all of us to be on the same page, to have access equally to the information. The problem with a continuing hearing is that that handicaps certain members as they move in and out.

I would ask that you reconsider that, simply recess for a few moments, urge the members to come back quickly so that we can come back, because there are those of us who are keenly interested and will get back here, and I would suggest to you that there is a much more egalitarian spirit to that approach.

Mr. HUNTER. Certainly. I understand the gentleman's concern, and I'm glad that this is an important hearing to him as well, and if he would like to do that we will do that. We will adjourn.

Mr. Abercrombie will be the next up, and, Mr. Abercrombie, would you like to run a fast question now or wait for a more full time later?

Mr. ABERCROMBIE. I will just ask the question.

Maybe you can think about it, and then we will get an answer.

Mr. HUNTER. Go right ahead.

Mr. ABERCROMBIE. And I'll elaborate when I get back.

This has to do with the idea of whether testing is necessary in order to produce an atomic device, I guess it is the way it is called now, or whether something could be constructed, and this has to do with proliferation and treaties, and I will ask that in more detail when I come back.

Thank you.

Mr. HUNTER. OK.

If you can be pondering that question, folks, and we will be back in about 10 minutes, and I would urge members to get over and vote and come back as soon as possible.

Mr. ABERCROMBIE. The main point is, I want to find out whether in fact there has to be more testing in order for some entity to be able to produce an atomic device or something similar.

[Recess.]

Mr. HUNTER. The hearing will resume, and Mr. Abercrombie has laid out the basis for his question.

Mr. Abercrombie, the floor is yours.

Mr. ABERCROMBIE. Thank you very much, Mr. Chairman.

Let me just add a bit more preamble if I might, the reason I am asking a question. A little bit of history on this, and I don't think I am too different than a lot of Americans my age. I came into high school post World War II and can remember writing an essay in high school on the uses of atomic energy and never understanding the implications at that time of radiation proliferation with missiles, all the rest of that kind of thing, just thinking that, well, this is this, great energy force. I remember writing that essay about how we were not going to have to have electricity generated by fossil fuels and that this was going to advance—all that kind of thing, I don't think because I was stupid, because I think I was naive at the time as to what all the implications were. So the reason I am asking about the testing goes back to that.

I think the origination of most of our ideas about atomic energy, et cetera, in that kind of a framework where it was first seen by everybody as, yes, there is this terrible thing that happened in Hiroshima and Nagasaki, the atomic bomb, but overall, this whole question of fission and fusion would result in peaceful uses, et cetera.

Now the reason that I'm asking the question is, given what you know about the technology, or technological, really, capacity that exists today, is it possible now to assemble, I use the word "devices" because that is the word I have seen most often—I don't know if it is a cliche or phrase of art or whatever; you can maybe enlighten me on that—without having to do elaborate testing any more, where you don't have to get involved in arguments about whether France should be down off Tahiti with underwater testing or whether we should do this kind of thing.

The reason I'm asking that kind of question is, I would like to know a little more about how vigorously we should pursue the question of testing as part of nonproliferation treaties.

Dr. BAILEY. The short answer to your question is that you can assemble a nuclear device without testing, one that is workable, there are countries that have done it, if it is a first generation weapon. However, to proceed to more technologically sophisticated devices, smaller weapons, one would have to test to assure that they will work.

Dr. MILHOLLIN. The Hiroshima device was not tested before it was used.

Dr. BAILEY. Correct.

Dr. MILHOLLIN. South Africa built a series of similar devices which they felt would work, but they didn't test them. Pakistan has a device which both it and we agree will work, and it has not tested it so far as we know, and Israel's arsenal has never been officially tested. Of course there was a flash in the South Atlantic that many people think was a test, but still I think you can see that you can even go to mass production, as Israel has done, without an overt testing program.

Dr. PAYNE. I think it is fair to say that testing has more to do with reliability, safety, modernization, and so forth as opposed to a capability, per se.

Mr. ABERCROMBIE. So if you did have either as, for example, the Russian Mafia or what is called the Russian Mafia now or you did have terrorist groups that were able to get a hold of these devices or even a branch or a section of a sovereign government's operations, maybe under very deep cover of some kind, is it possible to transport these devices or place them in such a way, on ships, on trucks, et cetera? Is that a fictional contrivance? In other words, can they be moved without having to go to cruise missiles, as you mentioned, or could they be taken across borders, placed different places, and perhaps set off by remote control or something of that nature?

Dr. BAILEY. A tactical nuclear weapon can be as small as a fire extinguisher, so imagine how many fire extinguishers you could put in the trunk of your car to get an idea. Now other weapons can be quite large.

Mr. ABERCROMBIE. Would the same thing apply to biological?

Dr. BAILEY. Biological weapons—imagine something the size of a tennis ball could kill hundreds of thousands of people. A very, very small amount of biological agent that is not detectable by any airport detector in the world could be a weapon of mass destruction that could kill a lot of people.

Mr. ABERCROMBIE. OK. The final thing I want to get at, given all that then, just bluff and bluster or threats or giant missile programs or even economic boycotts and so on of nations are not necessarily going to prevent anything like this from taking place. It would seem to me part of the logical extension of understanding the implications of what you are all saying is that very vigorous diplomatic activity has to take place in the hopes that we cannot necessarily mollify but certainly modify perhaps our relations with other countries, because if someone does decide that they have been made into an outlaw nation, say, fairly or unfairly, there is revenge even that can take place against the rest of the world if people feel they are cornered in that respect.

Dr. BAILEY. Diplomacy is exceedingly important, and it plays a role in preventing or rolling back proliferation, but diplomacy alone is unlikely to succeed. We were just talking during the break about the point that it takes a suite of activities, it is not just diplomacy, it is not just export controls, but it is also defenses.

Mr. ABERCROMBIE. I understand that, and I am all for that, but you would not diminish—I am a little worried that in the thraldom almost of dealing with all the technological and military, possibly military, and terrifying scenarios, that we might neglect the element that is even then more important, to be talking to one another, to possibly working through the United Nations or try to achieve some kind of treaty status even on an international basis which would allow for inspections and all the other kinds of things associated with that. That shouldn't be diminished in importance then, if I understand you correctly, that if anything should receive a higher profile than it does right now.

Dr. BAILEY. Do not depend on inspections, at least in the chemical and biological weapons areas, to do anything for you, to raise

confidence that there is not cheating going on. So while diplomacy, jawboning, arm bending, is a good thing to do vis-a-vis a nation you suspect of wrongdoing in this regard is a good thing, you cannot really in any way expect an inspection regime to do anything for your confidence about nonuse or nonproduction.

Dr. MILHOLLIN. But, you know, it is true, if you look around the world, that the countries we are most worried about are the ones that don't have political systems like ours. I mentioned Brazil and Argentina during my testimony. There is an example of a case where we had civilian governments, we had pressure from outside, we had export controls, we had a willingness locally to work together, and all those things converged to move those two countries out of the problem column and into the okay column, and the diplomatic and, I guess, good will dimensions of that process were at least as important as anything else.

So I think it is fair to hope that if we could solve the differences, political and other kinds of differences, among countries, that the risks would go down.

Mr. ABERCROMBIE. In other words, it is important to keep pursuing that, not just to assume that there is going to be eternal enmity between people.

Dr. MILHOLLIN. That is right. In the Brazil and Argentina case is a wonderful encouraging example of that, and it is a recent one.

Mr. ABERCROMBIE. OK.

Dr. PAYNE. I think it is fair to say that the political solution or the political avenue ultimately is the most important one. I mean we went from absolute enmity with Great Britain to the closest allied relationship with Great Britain in the space of about 70 years. We have changed relationship with the Soviet Union, now Russia, in the space of about 10 years.

The problem of relying on political changes is that—just that, they tend to shift and change perpetually, and so to count on making friends with all of the countries that are going to have these kinds of systems is probably to lead us in an overly optimistic direction, but the policy is still important, intelligence is still important, all of those avenues.

Mr. WELDON [presiding]. The gentleman's time has expired.

Mr. ABERCROMBIE. Thank you.

Mr. WELDON. The gentleman from Texas, Mr. Thornberry.

Mr. THORNBERRY. Thank you, Mr. Chairman, and you all are heading down the road that I was interested in, because while what may have worked with Argentina and Brazil will obviously not work in a number of countries, don't you agree, and we have a danger of putting too much reliance on those sorts of carrot-and-stick export control type approaches and perhaps neglecting some defensive measures that we still have to take in the meantime.

Dr. PAYNE. But what we hopefully will be pursuing is a package of responses to the proliferation problem, and the package, in my opinion, has to include missile defense; it has to include missile defense that is capable against cruise missiles, as Dr. Bailey mentioned; it should include continued efforts at export control; it should include continued efforts at diplomacy, as Congressman Abercrombie just mentioned. In other words, it is a whole suite of responses to this emerging threat that is really going to define the

post-cold-war period and the problems we are going to face. No one solution is going to fix it.

In the past we have avoided some parts of this suite of instruments, we have basically avoided missile defense, and I think that is why people are now pointing to missile defense, because it is an avenue that we haven't taken before, and we are saying at this point we need to add that to our kitbag in terms of responding to the proliferation threat.

Mr. THORNBERRY. So we need a range of options to be able to respond in the method that is appropriate depending on the political circumstances in each country.

Dr. PAYNE. Precisely.

Mr. THORNBERRY. I think that is a good point.

Professor Milhollin, let me ask you, what countries do you see out there now that are posing a problem that perhaps more vigorous export control measures might have some success with?

Dr. MILHOLLIN. I think that both India and Pakistan need Western technology, and they are both vulnerable to pressure, and so I think those two countries are prime candidates for export controls.

Also, of course, Iran is another candidate. Our problem there, as I said in my testimony, is that other countries don't share our view on Iran, and so it is not so much a question of what the objective is as how to achieve it, and I think we just have to be—we, the United States, has to be a lot more effective diplomatically than we have been in getting other countries' support.

Because of the problem of retransfer—that is, that you can have things that are supposed to go to country A and they wind up in country B—if you lower export controls across the board it makes it easier for Iran to get things through retransfers. So you are being unrealistic if you think you can decontrol items to everybody in the world except Iran and that Iran won't have an easier time getting them.

Mr. THORNBERRY. I see.

Dr. Bailey, of course you mentioned cruise missiles. Can you or the others comment on where you see cruise missile proliferation going in the next 10 to 20 years? Is this a situation where every or nearly every country in the world could end up with cruise missiles that could have a variety of kinds of warheads?

Dr. BAILEY. The characteristics of the cruise missile proliferation problem have changed profoundly within the last few years, say 5 years, because of the advent of GPS, global positioning system technology, and the spread of other things that will assist with guidance.

I think that the problem will become exacerbated as nations discover this phenomenon, and so the 40 or so nations that now have cruise missiles will probably increase maybe twicefold. So I think that it will become a dramatically worsened problem in the next 5 to 10 years. I mean it is a near-term problem.

Mr. THORNBERRY. Are you also concerned about sales of cruise missiles from existing countries that have them?

Dr. BAILEY. I am worried about sales, but I am more worried about indigenous developments. You know, the inspectors in Iraq came across in the desert an airplane that was fixed with nozzles,

spray nozzles, and they thought, "Well, gee, this is interesting. What is this out here for?" The Iraqis responded, "Oh, that is for crop dusting," and the inspectors looked around and said, "This is desert; nothing grows out here; we had better come back to this." Well, they wanted to revisit the whole issue and see the aircraft up close and personal in a subsequent visit, and it was gone.

So that, to me, highlights the problem that here's a little Cessna or some other small aircraft with a delivery capability that export controls would do nothing to address that problem. So I'm worried about the low-technology end, not the high-technology end as much.

Mr. THORNBERRY. Thank you.

Thank you, Mr. Chairman.

Mr. WELDON. Thank you, Mr. Thornberry.

The gentleman from Texas, Mr. Edwards, is recognized for 5 minutes.

Mr. EDWARDS. Thank you, Mr. Chairman, and, Mr. Chairman, I want to compliment you and Chairman Hunter for this hearing. This is, frankly, the first time this session I have felt comfortable about the way in which we are approaching the whole issue of threats of weapons of mass destruction. Rather than, as we had to during the Contract With America debate, we had to focus on immediate deployment or as soon as possible deployment or practical deployment of a national missile system, now we are looking at the whole range of threats, biological, chemical, and nuclear, and I think this sets a wonderful framework through which we can continue to move ahead.

It seems to me, in looking at the framework of our approach, there are three assumptions we can make as a committee. One, we can assume that chemical, biological, and nuclear weapons all pose a serious threat to U.S. troops in theater today and to the continental United States either now or some time phased in in the future. The second assumption is, as Chairman Weldon pointed out, Members of Congress simply don't have the facts right now to be able to accurately conclude what is the most immediate threat and, consequently, where do you put your resources. It seems to me the third assumption we ought to operate under is that Congress has limited resources to deal with the threat of weapons of mass destruction, and I think that is important for this committee to consider.

If we had unlimited resources I would be favoring deployment immediately of a space-based sensor system, if we had the technology, and go on and move through all of these different options. Unfortunately, we don't have that luxury, and I think that is what makes the framework in which we make these decisions so very difficult.

It seems to me what those three assumptions tell me is that, number one, this committee must follow the course you are setting us on, and that is—and you hit the nail on the head, Mr. Chairman, and that is, we have got to simply get the facts on the table. I am not comfortable yet, and I don't know how many other members are, as to what is the most immediate, most serious threat and where do we put our priorities; and the second thing it tells me is that, before we decide to put all of our resources into one area, whether it is theater missile defense or a national missile de-

fense, space based or ground based, we need to look at the whole range of options where we will have to spend resources.

We may come down with the conclusion that we need to put more money into nonproliferation. We may decide our top priority ought to be intelligence. We may decide it is theater missile. We may decide it is research on vaccines. We may decide, upon the conclusion of hearings, that it is a national missile defense system. I don't have the answer, but I think you have us going, Mr. Chairman, in the framework in which I think we can ultimately make a reasonable, rational decision.

Let me ask you Dr. Milhollin and Dr. Payne, if I could, on the issue of deterrence.

I think, Dr. Payne, you said that deterrence is not an effective response, and of course I know it depends on what scenario you are looking at, but give me your response to this thought. It seems to me the deterrent threat of total annihilation of a country is a pretty effective deterrence to the possibility of a Third World country or any country sending ICBM's into the United States. If they know we can identify where those ICBM's came from and we can literally wipe them off the face of the Earth, as we can, that ought to be a pretty effective deterrent, at least up to a point.

It seems to me where that kind of deterrence isn't effective, as you mentioned, Dr. Milhollin, is the placement of a bomb in a boat, you know, or in a U-Haul-it truck, or biological weapons. In a way, that would push me toward the direction of saying maybe we need to put more of our resources not necessarily into an immediate national missile defense system, maybe it ought to be in more intelligence and some ability to deal with these other sorts of means of delivering weapons of mass destruction for which deterrence is really no effective counterbalance. I don't know, but I would just like your thoughts.

I guess the question I would like to get to is, given—and you might need to do this in writing to follow up—I guess we could pick out some numbers, and, Mr. Chairman, you all would know what we would realistically be looking at. If we had $1, $2, or $5 billion to add to the whole issue of how do we defend the United States and our troops against threats of weapons of mass destruction, how would you spend that money?

If I could just ask briefly maybe the three of you, you know, if you had a couple more billion dollars, several more billion dollars right now, would you put more of it into intelligence, would you focus on theater missile defense until we are comfortable we can protect our troops, then go into national missile defense, or would you do all of those?

I have spoken the 5 minutes so perhaps you will need to do that in writing.

Mr. HUNTER [presiding]. That's OK. The gentleman can answer the question if you want.

Mr. EDWARDS. Thank you.

Dr. PAYNE. The question with regard to deterrence is an important one. My point is not that deterrence is ineffective, it can be effective on some occasions, my point is that it is largely unreliable and is going to be increasingly unreliable in the post-cold-war period, and the problem is, we won't know going into any particular

crisis whether deterrence is likely to work then or whether it is not likely to work then, so that the difficulty is trying to structure a deterrent policy that you can have some confidence in as you go into a crisis or preferably in advance of a crisis.

Now the scenario you painted is one of the United States threatening total annihilation of a country possibly launching a missile strike at the United States, and you ask the question, quite properly, wouldn't that be a good deterrent, and the answer is, it depends. It depends on whether the side that you are trying to deter believes your threat, it depends on whether the other side understands your threat, whether you have communicated that threat adequately to the other side. It depends on a whole series of contextual issues that we will not know whether those necessary conditions are there for the deterrent to work. That is the problem with deterrence as we think about it in the forthcoming future and why my point isn't that deterrence is ineffective, is that it is going to be unreliable and we have to prepare for that.

Dr. MILHOLLIN. I would just like to talk about some specific cases. If you look around the world, who might shoot an ICBM at the United States? India I think is the country with which we could conceivably have a dispute that is probably closest to being able to build an ICBM, but to do that India would have to test it first across thousands of miles of ocean, which would be observed by everybody, and the world would fall on India if it did it.

Second, if India or Iran or any other country ever launched an ICBM at the United States with a nuclear warhead on it or any kind of a mass destruction warhead on it, I can't imagine it happening because of the consequences for the country launching the weapon.

So if you are asking where we ought to spend our money, I think we ought to spend our money on threats that are more likely to happen, and those threats I think are the ones which will come about through a cruise missile fired at us from close in or even a bomb put in a building or a chemical or biological agent put in a building, because the person or group or country that is going to attack the United States with a weapon of mass destruction is going to want above all not to get caught, and that indicates to me that we need to increase our intelligence capabilities, we need to stop the spread of technologies that can enable countries or groups to do it.

So if I had a few extra billion, I would put it into intelligence, diplomacy, and I guess vigorous export control work rather than trying to build better deterrence if we assume that our deterrence is OK as it is. Now if it isn't OK as it is, and if there are holes in it which can be shown to exist, then obviously we ought to spend it on that too.

Dr. BAILEY. If I had $5 billion, I would increase—to try to make defenses more effective because it has already clearly been shown to be the case that better intelligence, better export controls, and better arms control efforts have not worked, at least in the CBW area [chemical biological area] where would I spend the money?

I would spend it first on theater defenses, theater defenses against ballistic and against cruise missiles. Therefore, my third priority would be national missile defense, and in that subset I

would spend money first on cruise missile defense and, fourth, on defenses against ballistic missiles, intercontinental ballistic missiles.

Mr. EDWARDS. Thank you.

Thank you, Mr. Chairman.

Dr. PAYNE. May I add a point because there is a really important issue here, and that is addressing the question of who might shoot a missile at the United States, and the question is posed and then the answer is given, we can't think of anybody who might shoot a missile—actually shoot a missile at the United States, and let me submit that that is an important question but it really misses the point.

The point is, who might threaten the United States, not shoot a missile at the United States. In other words, deterrence and coercion is about not shooting your missile, and if the United States is threatened by missiles of various ranges, that is going to impact on our ability to project power into those regions. So what you are going to find is, the United States is going to be paralyzed from projecting power into various regions not because some country actually wants to shoot a missile at us but because there is the threat, the withheld threat, that it has that if we project power into their arena they might shoot a missile at us; they might in a retaliatory mode.

In other words again, it is where I made the point earlier that deterrence and coercion is about withholding the threat, not launching the threat. So the question really isn't who is going to shoot it, the question is who out there with the capability to threaten the United States to withhold the threat so it can coerce them—deter the United States, and there are a number of leaders in countries who have said that that is what they want. Colonel Qadhafi has said he would like to have that capability; Saddam Hussein has said he would like to have that capability; various leaders in India have said they would like to have that capability. So that is an important point because it has to do with whether we protect ourselves against the threat, not just whether we are able to identify someone who is willing to launch at the United States.

Mr. EDWARDS. Thank you.

Mr. HUNTER. I thank the gentleman.

The chair reserved on the initial round of questioning, and I just wanted to ask Dr. Bailey before we go to Mr. Lewis of Kentucky, you mentioned your order of prioritization, theater missile defense to get that what I would call an umbrella over our theater forces. I think we have got to do that as fast as possible.

We just had a hearing on that with our service officers headed by General O'Neill who went across the array of theater systems that had—Navy, upper, lower tier; PAC–3, et cetera, and we asked him specifically on each system, what is the max you could take in terms of funding to accelerate the program to the maximum level possible? The upshot was that they couldn't spend effectively more than about a billion dollars to full fund, robust fund, every program.

If you assumed that this committee is going to give them that, that takes in that order of priorities, that fleshes out theater missile defense [TMD] at least for this year, and the impression, al-

though we didn't ask the precise question, I think—and my colleagues can correct me if I'm wrong—what would it take to fully fund anti-cruise missile systems, which they are also developing; some concurrent systems like the Navy lower tier is also cruise missile capable, but my instincts are that probably wouldn't be more than several hundred million dollars this year.

So if you presume that we are going to fully fund cruise missile and theater missile defenses in this committee, then that would leave a national missile defense as a priority, and I would just ask Dr. Bailey to comment on that. Would national missile defense then be a priority if you fully funded the theater and cruise missile defenses to their utmost? What would you do with respect to national missile defenses?

Dr. BAILEY. It is my understanding that there are additional technologies that would be applied in the national missile defense scenario that are different from those that would be used in the theater missile defense. I am not an expert in those technologies, therefore couldn't go into details, but I think that as a second subset of priority I would begin to fund the national missile defense, and I noted or tried to note very carefully that my priority within that subset would be against cruise missile threats to the United States which I think have been underestimated or not given sufficient attention.

Mr. HUNTER. OK. Thank you very much.

Mr. Lewis of Kentucky.

Mr. LEWIS. Yes, thank you, Mr. Chairman.

Dr. Bailey, I agree with you on the missile defense system. My question though, as you spoke a little while ago, and this question may have been asked—I'm sorry I was absent for a while—but the biological weapons can be delivered by simple technology. What would be the best deterrent to use against biological weapons, do you think?

Dr. BAILEY. I think that the best deterrent against biological weapons is either nuclear or conventional, and I say either/or because it would depend on the individual scenario. If we could rapidly deploy and if we could afford a conventional retaliation, then I think that that would be the most appropriate. However, there may be cases in which there is a massive threat when a convention retaliation would not look realistic, it wouldn't look realistic in the eyes of the perpetrator. So in that case we need to have a nuclear deterrent up our sleeves that we could use.

And one final remark in that regard. I think that our current nuclear forces are not necessarily structured in a way that they would be an ideal deterrent against a proliferant state. We have very large yield weapons primarily, and we have not tailored our nuclear deterrent in a way that it could involve small yield response.

Mr. LEWIS. What would be the case if this would be a terrorist group that basically would not represent a particular country?

Dr. BAILEY. You can't deter terrorists. That is what it comes down to.

Mr. LEWIS. OK. Thank you.

Mr. HUNTER. I thank the gentleman.

Mr. Geren of Texas.

Mr. GEREN. Thank you, Mr. Chairman.

Professor Milhollin, you talked at some length in your prepared remarks about the situation in North Korea, and perhaps you have elaborated on those remarks in other questions that I missed when I was away from the hearing, and I hope I am not asking you to repeat yourself, but could you talk a little further about North Korea? It is unquestionably a major proliferation threat. And can you talk about our ability to independently verify their cooperation and also what level of confidence we have about what other facilities the North Koreans perhaps could have that could pose a threat, and also talk about the likelihood that they might engage in selling some of their technology around the world.

Dr. MILHOLLIN. I think our intelligence-gathering effort on North Korea has been fairly unsuccessful. I think it is quite possible that North Korea could have facilities, stockpiles, or fairly small weaponization efforts going on that we don't know about.

One of the difficulties with the agreement we have with North Korea is that we don't get to do surprise or special inspections of that country for 5 years, so that while we are in effect rescuing them economically, they could very well—they could very well continue to develop their nuclear weapon capability, and I think they probably will.

I am trying to remember now. You had a list of questions.

Mr. GEREN. Talk about our ability at verification, which obviously that 5-year gap is a problem.

Dr. MILHOLLIN. I think the verification is going to be difficult. I don't think we are going to learn a lot more than we already know unless we get lucky with defectors, and even if we were to get lucky and a defector came out and said, well, there's this big facility under a mountain that you guys don't know about, and they are doing A, B, C, and D, and here are some pictures that I took with my instamatic when nobody was looking, we don't have a right to go into those, we don't have a right to go force them to let us in there under the agreement. So we don't have much, I guess is what I'm saying, from the North Koreans.

I think the International Atomic Energy Agency is verifying the easy things; that is, they are verifying that the reactor construction has stopped, they are verifying that the fuel rods that we know they have are not being reprocessed, they are verifying that the small reactor is still shut down, they can do that, but it is what you don't know that bothers you in North Korea.

Mr. GEREN. Would anyone else like to comment on the North Korean situation?

Dr. BAILEY. I would just like to add that it is interesting that the agreement with the United States essentially obviates the requirement that North Korea abide by its international treaty obligations. I would second Dr. Milhollin's statement on that. The agreement leaves us with less than we would have had before the agreement in terms of inspection requirements.

Dr. MILHOLLIN. As far as selling things is concerned, you find out about that through intelligence. They are not going to declare an open contract to selling something to somebody, you are going to have to dig it out and find it.

It seems to me likely that while this agreement is in effect they are going to be shipping missiles to the Middle East, we are going

to pick it up, and then there is going to be a new crisis, and everybody will have to reevaluate his or her position on the subject based on how many missiles were on the boat and where it was going, and so forth. I foresee that happening.

Mr. GEREN. Dr. Payne.

Dr. PAYNE. I would just add that the developments in North Korea have led to a debate in Japan with regard to missile defense. There were some statements here earlier about the level of visibility of the discussion of missile defense in the United States. I would just point out that in Japan the level of discussion of missile defense has gone up equally, to an equally visible level because of these developments in North Korea and the missile arena and also in the weapon of mass destruction arena, with Japan now speaking very favorably toward the need for missile defense in terms very similar to some of the statements we see in the United States.

Mr. GEREN. Thank you.

Thank you, Mr. Chairman.

Mr. HUNTER. I thank the gentleman from Texas.

The ranking member of the full committee, Mr. Dellums, is recognized.

Mr. DELLUMS. Thank you very much, Mr. Chairman.

First, I would like to make this observation that as we proceed in this particular hearing a very interesting and subtle change is occurring, because all three of our panelists have pointed out that you cannot simply look at one threat and then find your favorite solution to that one threat, that there are a multiplicity of threats out there and that you have to come to terms with a suite of responses and approaches, and I think that that is different. That subtlety has broadened this hearing beyond simply looking at the question of ballistic missile defense as we generally talk about that in the context of nuclear weaponry. That has now broadened to include something much broader.

In the memorandum that you, Mr. Chairman, had prepared for the members in preparation for this hearing, you know, you asserted that intercontinental ballistic missiles are becoming the weapon of choice for a number of countries. Maybe not. Intercontinental ballistic missiles, they point an unambiguous incriminating finger at whoever fires them, they do not provide for any plausible deniability; once you have fired, everybody in the world knows that you fired the weapon; and, thirdly, it can invite preemptive strike. Now all of those characteristics tend to be the reason why deterrence works.

Now Dr. Payne, in response to a question about deterrence, agreed that deterrence has worked. Obviously. It has been 40 some years, we have not fired nuclear weapons at each other.

But then your assertion, Dr. Payne—and I wrote it down—is that increasingly deterrence is unreliable in a post-cold-war world. Let's deal with that for a moment.

It seems to me, intellectually, if you are absolutely correct that deterrence is increasingly unreliable in a post-cold-war world, then one can extrapolate that the weapons that we will be dealing with on an increasing basis would not have the characteristics of being unambiguously indiscriminating. You can engage in low trajectory, you can engage in plausible deniability, and they can be so hidden

that you can't engage in preemptive strikes, which means on an increasing basis intercontinental ballistic missiles may not be what we are facing in the future. If that is correct, then what are our panelists saying? Chemical weapons, biological weapons, and in response to a question to the distinguished gentleman, Dr. Bailey said you can't build a defense system for terrorism; you can put that kind of weapon in a tennis ball size.

The witnesses indicated that cruise missiles, even if you establish national missile defense, cruise missiles should be the number one priority. What is the characteristic of a cruise missile? Air breathing, low trajectory. So you are not talking about over-the-horizon kind of things.

So, Mr. Chairman, I find it fascinating because if you listen to what is being said by this group, (a), you have to expand your response so that your threat list is a much broader list; (b), you have to come to a suite of responses that include diplomatic, control, treaty, and, as they point out, defense, but when you come to missile defense, if they are correct that the major threats on an increasing basis are not going to be intercontinental ballistic missiles but cruise missiles, chemical weapons, and biological weapons, then maybe we have attempted to solve the wrong problem the wrong way with the wrong amount of money, by clinging tenaciously to this notion that you have got to build an incredible national missile defense system to shoot down intercontinental ballistic missiles when all three of these witnesses, in a very articulate fashion, have pointed out that that is really, at the end of the day, not the highest priority, not the major percentage, and not where your threat is going to come. So you are going to look at terrorism, and building dollars into a system doesn't handle that, certainly doesn't handle shooting down cruise missiles.

One last point. Dr. Payne, I cannot allow one comment to go without response. In response to one of our colleagues, you indicated that we need a suite of approaches and defenses. I agree with that. Included in that list you said ballistic missile defense, which we have not dealt with in the past. I would submit to you—just finally—I would submit to you that we have spent between $30 and $35 billion. That is no small amount of money, and I don't think that one can assert that that is not some kind of response. The tragedy of spending that $30 to $35 billion is that it wasn't focused and it wasn't bounded.

Whether you agree or disagree with the present approach, one thing about it is, it is focused, it is bounded, and it comes closer to looking like a program than it has looked in the last 10 or 15 years as we have pursued this kind of technology, and I would submit to you that that would mean, it seems to me, that we have indeed engaged in pursuing this course of action for some period of time. I would like to have $30 or $35 billion to do nothing with.

But it seems to me that we have spent a great deal of money, and I know you did not mean it cavalierly, but to throw those kind of comments out there and communicate to the American people that in some way this approach has not been dealt with, we have been up to or our eyeballs with some kind of missile defense, foggy, unfocused, unbound, and I know undisciplined, but nevertheless I think we have gone down that road. But I think that at this par-

ticular point they have started to engage in some focus, and I would appreciate it if you folks would respond to some of the observations that I have made thus far.

Mr. HUNTER. Certainly.

Gentlemen and Dr. Bailey, the floor is yours, and I think, Dr. Payne, your remarks were mentioned by the gentleman, so if you want to lead off, go right ahead.

Dr. PAYNE. Thank you.

Let me start with the last point first, and that is with regard to the suite of responses, and my point was that the suite of responses has to include the full panoply that we talked about, and, of that panoply, ballistic missile defense is the one part of it that we haven't deployed, and in fact we have a treaty signed in 1972 to prevent us from deploying any serious national missile defense capability.

So the point I was making is that the visibility of ballistic missile defense as part of that suite of tools I think is because it is the one piece of this panoply of options that we have specifically disavowed the deployment of at the level of national missile defense and have signed a treaty saying we wouldn't deploy it.

We have pursued the Missile Technology Control Regime, we have pursued the NPT. In other words, we have pursued diplomatic efforts, and I think those are valuable, they have been helpful, I wouldn't step away from this; what we haven't pursued is the deployment of national missile defense, and we have not even during the Reagan administration attempted to revise or adjust the treaty successfully to allow us to deploy national missile defense. That is why I think the visibility is in that area, and that is what I meant by my comment, not that we haven't spent a good deal of money on the R&D for missile defense over the last 10 years.

Mr. DELLUMS. Mr. Chairman, would you permit just one response?

Mr. HUNTER. Certainly.

Mr. DELLUMS. On your latter point, you had not mentioned ABM directly, but you have alluded to ABM. It would seem to me that a lot of discussion about China—China has nuclear capability. It would seem to me that if they did develop nuclear capability they probably would target the United States second, Russia first. If that is indeed the case, the United States and Russia would have some basis upon which to sit down and revisit the ABM Treaty in a fashion that would allow both countries to feel comfortable, because at this point it is more of a regional situation than it is intercontinental, and in that regard it seems to me we don't have to go down the road to throw out the ABM Treaty as if in some way we can abrogate it unilaterally, we can sit down on a mutual basis and attempt to resolve that problem.

The final response I would make is that if your conversation is about Russia, I would suggest to you that I would go back to the original point, deterrence does work, because where you are talking about intercontinental ballistic missiles, where you can tell were they fired, they can't deny that they fired them, and you know essentially where most, if not all, of them are, that deterrence in that instance can work, does work, has worked.

Dr. PAYNE. With regard to the ABM Treaty, it is an absolutely important point, and I think that you have addressed it quite properly. My suggestion was not that at this point the United States simply abandon the ABM Treaty and unilaterally withdraw from the ABM Treaty. In fact, I have had recent conversations with members of the defense committee of the Duma, and these members have suggested that they would be quite interested in the possibility of revising the ABM Treaty cooperatively to allow national missile defense on each side.

So it wasn't my suggestion with regard to abandoning the ABM Treaty, it is my suggestion that we pursue seriously and vigorously cooperative revisions to the treaty necessary so that both sides can have the type of limited national missile defense system that they would like to have.

Mr. DELLUMS. Thank you, sir.

Dr. MILHOLLIN. I would just like to make a couple of points.

First, if you are thinking about the possibility that a country could shoot a missile at the United States, you have to remember—or I think it is important to note that the small nuclear forces in the world have gone to sea. The British, the French, have gone to sea. They rely primarily on submarines. They have a lot of submarines, and cruise missiles have a lot of advantages over ICBM's, and you have to assume that your opponent is going to want to get to his objective as quickly and as cheaply as possible, and that also argues in favor of submarines. So I think you have to be clear eyed about what the other side is thinking.

Also, if you are Saddam Hussein and you have five nuclear weapons, you have to think about how you might want to use those against the United States. I am not making an argument here one way or the other on the ABM Treaty, but if you have got five bombs, you want to get the maximum out of them. It is not obvious that you would put them on ICBM's.

The Indians are going in the direction of submarines; the Chinese are going in the direction of submarines. You have to think about that.

The other point I would make is that the Agni missile which is, I suppose, the one that at least in a potentially rival country the furthest along is indigenous except for its first stage, which was copied from a United States missile, its second stage, which was built on Russian technology that was imported, and its guidance system which was built with a lot of help from Germany. So except for the first stage and the second stage and the guidance system, it is an entirely indigenous missile.

The point I am making is that you can stop this stuff with export controls. If you don't sell it, you don't have to defend against it.

So I'll stop there.

Mr. DELLUMS. Thank you, sir.

Mr. HUNTER. Okay. Let me now recognize the ranking member, or the chairman of the R&D subcommittee, Mr. Weldon, and then maybe we will have a chance—I want to be able to engage the ranking member of the full committee, Mr. Dellums, when we have a chance for everybody to ask their questions.

Mr. Weldon is recognized.

Mr. WELDON. And we thank you for bearing with us, and hopefully you can stay beyond the 12 o'clock time period for a short period and we can get into some detail. I know Mr. Hunter has a series of questions.

Dr. Bailey, I am very interested in your testimony, and let me say at the outset that there was no preconceived notion when we scheduled these hearings that somehow we were all going to come to some conclusion that one missile system or the other in fact is the answer. To the contrary, my reason for wanting to have these hearings is to get some facts out on the table that we have not heard very clearly before.

Dr. Bailey, your comments about cruise missiles, I wish I would have heard that last year. As a matter of fact, I read your Senate testimony where you laid the foundation for your testimony today and made the point that we have often heard from the more liberal wing of the Congress that, you know, the threat to our mainland is now real. But what you have pointed out is. It is real when you talk about the fact that cruise missiles and the information we have been given said 40 countries; we have been told over 77 countries in the world have cruise missiles right now, over 20 countries are manufacturing cruise missiles, and that these cruise missiles in fact can reach the mainland of this country, depending upon how they are deployed, and I want to follow up on this because what is especially troubling to me is that yesterday morning at a breakfast meeting General O'Neill stated—and I'll give his exact quote—there is no cruise missile initiative within BMDO, O'Neill stressed, and he noted that the Under Secretary of Defense, Mr. Kaminski, is now looking at how we might address that issue, but as of today forget about national missile defense, forget about theater missile defense, we don't have a coordinated effort at cruise missile defense, and that is one of the reasons why this hearing is held, and I think it has identified for us a gap that we have to deal with, that we have to make sure that there are funds available, and that BMDO, or whomever in the Pentagon is in fact addressing the issue of cruise missiles, because I agree with you, I think it is a major threat that we have to deal with in the short term rather than the long term.

I do want to also comment on some testimony by Dr. Payne, because I think if members would have looked at his statement, in the third paragraph he makes the case in his testimony about the use of missiles being the primary source that most countries would choose to use to deliver a weapon of mass destruction to our country and specifically says that missiles are excellent tools for the desired purposes of deterrence and coercion, trucks and saboteurs are not.

So in fact you made that statement in your opening statement, and I think it is important for members to understand that, as we have heard from other witnesses, that certainly missiles are the weapon of choice for many of these people who are in fact getting the technology that they have not had in the past.

And to Professor Milhollin, one of the points that you stress very heavily is limiting weapons of mass destruction and technologies and the proliferation, and I would ask you to comment on some-

thing that troubles me very much, and I agree with you, by the way, in that area is need for more intelligence.

But I also happen to agree with the need to look at defense gaps we may have, and that is this administration's decision to not only allow the sale of the Garrett rocket motors to China but now to allow this year the technology for producing those motors that can be used in cruise missiles to go to the Chinese. That is terribly upsetting to me, and I know why they are doing it, at least I think I know why they are doing it, the pressure for jobs in this country and the Commerce Department's push to get this technology transfer approved. I have real problems with that.

I would like to ask all of you to comment on any one of those three areas to start, and I have some other questions I would like to go through with you.

Perhaps we could start with Professor Milhollin on, what is your opinion—are you familiar, first of all, with the sale of the rocket motors last year and now the technology transfer that is about to occur this year so that they can actually build these motors in China?

Dr. MILHOLLIN. I am familiar with the case to some extent. I think that in general we have seen a misapprehension by the administration of the importance of export controls. I don't think the administration recognizes that an export like the Garrett engine really is insignificant to the national economy. I mean we are talking about a very small amount of money, but the strategic impact of it could be very great, and it could trigger large defense expenditures far beyond whatever the profits would be to a particular exporter.

But that is the case not only with the Garrett engines but across the board for export controls, and I would like to remind the committee of my work on that subject, "25 Myths on Export Controls," which I have submitted previously. If you just look at everything that is licensed by us, by the United States, it amounts to a pittance compared to the national economy. So it is not really a jobs issue for the whole country, it is a jobs issue for a few companies, but the impact on the country is on all of our security.

So I think the administration simply has it wrong, it has its priorities wrong when it makes these export control decisions, and the Garrett engine case is certainly an example. China is, after all, the last big Communist country that does not have a good relationship with us. Why we should be helping them militarily I don't understand.

Dr. PAYNE. Let me address the point with regard to the rationale for missiles and why they have become a weapon of choice, a self-declared choice, by proliferant states, and that is specifically that missiles are seen as excellent tools for deterrence and coercion, not necessarily for striking, they would rather withhold the missile and strike—and not strike, but for deterrence and coercion missiles are fantastic, specifically because, as Congressman Dellums mentioned, they can be seen, they can be trotted out, and they can be seen, and therefore they make a nice threatening instrument.

So with regard to deterrence working, that is specifically why a number of countries have said they want missiles, they want to have long-range missiles. For example, why else does North Korea

want a Taepodong–2 missile of extensive range, possibly including range to hit the United States with a reasonable size warhead? It is for the power of coercion and deterrence that is in those missiles, and that I believe is the more important issue, as opposed to whether anyone would be willing to strike the United States. It is, will the United States be willing to project power into those regions in the face of missiles and weapons of mass destruction? It paralyzes our power projection capability. That is the key problem.

Mr. HUNTER. We will take a fast break.

Mr. DELLUMS. Would the gentleman yield briefly before we take a break?

Mr. HUNTER. I would be happy to.

Mr. DELLUMS. I would say to the subcommittee chairman, Mr. Weldon, that on your point about cruise missile technology in BMDO, there are hundreds of millions of dollars—have been hundreds of millions of dollars spent in the Department of Defense generally. If there is a question of management, that is an issue we should pursue, but it is not an issue of whether there are programs there in classified and unclassified versions of programs to the tune of hundreds of millions of dollars, and so I just wanted to put that point out there. If we have got a concern about management, then that is a different issue, but there is money being spent on that research, as I am sure my colleague is aware.

Mr. WELDON. I thank my colleague for the comment, and I understand, and I am aware of moneys that are being spent on cruise missile technology.

Mr. DELLUMS. On cruise missile defense.

Mr. WELDON. Defense.

In the debate that has occurred in this body, we tend to focus on theater and national, and I think to some extent not the cruise missile issue. Dr. Bailey has been perhaps a leader both in her Senate testimony and over here on saying we need to focus perhaps even more effort in cruise missile technology.

What I am pointing out is that our individual responsible for missile defense, General O'Neill, says he has no cruise missile effort. I am aware of the individual services having programs. My point is that perhaps we should elevate this to a higher priority and perhaps provide more coordination and consolidation of efforts in that area.

Mr. DELLUMS. That is what I meant about management concerns.

Mr. HUNTER. Would the gentleman yield for just a second before we go?

Mr. WELDON. I would be happy to.

Mr. HUNTER. Because I want to engage with my good colleague, Mr. Dellums, on this. One thing that is important about this hearing that I think is just one of the great aspects of the three folks that have testified to us is that they have said there is an array of threats from the tennis ball right on up—or the tennis-ball-sized biological system. But that necessarily leads us to the conclusion that there must be an array of solutions, and you have mentioned compositely export controls, greater intelligence, more diplomacy where it works, but also the need for missile defense, and I think if the gentleman from California is saying that it is an error to say

that missile defense is the only answer to this array of weapons of mass destruction problem that we face, then he is quite correct, but if he says that antimissile technology or the deployment of antimissile systems is not a necessary and critical component of the answer to the challenge of weapons of mass destruction, then he is in error.

Does the panel agree that the antimissile defense is an element that must be in place and must be fielded to have an adequate suite, if you will—and you have coined this term—of answers to the weapons of mass destruction [WMD] problem?

Mr. DELLUMS. You are going to engage me, right?

Mr. HUNTER. Yes, and I have engaged the gentleman. I would like him to answer that, and I ask forgiveness from my friend, Mr. Weldon, for imposing on his time.

Mr. DELLUMS. I just want to respond very quickly while our colleagues are gathering their thoughts. First, you are correct about my first assertion; that is, that we are looking at a panoply of threats out there; but what this gentleman is saying to you in clear and unequivocal and unambiguous terms is that, whatever the solution, it needs to fit the problem, and that is the point that this gentleman is making.

So I am challenging you to the highest level of intellectual, scientific, technological, and fiscal responsibility in fashioning a solution to the problem, and I'm simply saying that looking at deploying a missile defense system—at Grand Forks is it?—may very well be the inappropriate response to the level of significance that has been laid out here today. That is the point this gentleman is making.

Mr. HUNTER. And my response to that is, it may however be part of the response, if incomplete, and when we get back we will allow—let's put that question to our panel, and we will let them have at it.

Mr. DELLUMS. Fair enough.

Mr. HUNTER. OK.

[Recess.]

Mr. WELDON [presiding]. Why don't we resume and allow you to respond.

Dr. Bailey.

Dr. BAILEY. Yes; I would like to make the point that there are three types of technology for which this suite that we have been talking about are not applicable. Chemical, biological, and crude cruise missiles are all technologies for which export controls won't work. Arms control efforts, regardless of how good intentioned and comprehensive they are, will not work, and diplomacy will not be able to even see on the horizon because it can be done covertly.

Given that this suite, this panoply, will not work with those technologies, and notice I said crude cruise missiles, not Tomahawks but crude cruise missiles—given that it will not work, it is imperative that we consider defenses for those technologies in an even higher priority than we ordinarily would have. In other words, development of vaccines, development of battlefield detectors, development of capabilities to shoot down crude cruise missiles are very important.

As you may know, a crude cruise missile that flies at only 40 miles per hour in many respects is a harder target than one that moves very fast, and so we get into a whole different set of defenses, and those proliferation threats are the ones that I think should be put in a higher priority on the defense issue.

Thank you.

Mr. WELDON. The other two, would you like to respond?

Dr. PAYNE. On the question with regard to missile defense as part of the suite, my conclusion is that missile defense, both PMD and NMD, are essential elements in any suite of countermeasures that will be effective against the proliferation threat. If you can just imagine for a second, if Saddam Hussein had had a long-range missile during Desert Storm and Desert Shield, whether in fact the United States and the coalition would have been able to mount Desert Storm and Desert Shield, it is obviously a speculative question, but my guess is the answer is no.

I had the opportunity to offer testimony to the House of Lords, and after I had the opportunity to ask some of their lordships that very question, and the answer essentially was, "Are you kidding?" I mean it changes the entire risk calculus, and that is why my suggestion was it has the potential to paralyze the U.S. in the absence of missile defense.

Dr. MILHOLLIN. The question is whether missile defense is part of the solution to the problem but not the only solution. That is how I understand the question.

I think that it is a part of the solution if you can come up with a solution system that effectively protects our troops at a reasonable price, because we are talking about a situation in which we have forces committed and are we trying to protect them or are we trying to protect an ally like Japan which has reasonable grounds to fear missile development in a neighboring country.

I spent a fair amount of time commenting on the gulf war on television, and I was continuously surprised at the fact that we couldn't find the Scuds to bomb them and we couldn't knock them down as they were coming in, and I think it just turns out that it is a tougher problem technically than we think it is, and so I guess I would say that it is almost a technical issue; that is, whether it can be done and at a reasonable cost; and if the answer is yes, then I would be for it. And I am an engineer. I am just skeptical whether you can do it and whether you can do it at a level of confidence that would be acceptable.

Mr. WELDON. I thank you all for the testimony, and I would say that we agree with you, and I think the consensus of this committee is that we should proceed aggressively in the theater missile defense arena, and which we are doing, and I feel fairly confident, based on discussions with General O'Neill and others, that we are very close to being able to deploy a successful theater-based system.

I think the limitation will not be a technical one but, rather, will be one how we work around the 1972 ABM Treaty. That is going to be the problem. I don't think it is going to be a technical issue, and from a cost standpoint I think the funding levels that we are talking about, with perhaps an increase this year, will allow General O'Neill to meet his need. He doesn't want vast amounts of new

money. He said he can't spend it; if we gave him too much it would be something he just couldn't spend wisely.

The real debate is going to come down as to when and how we proceed with national missile defense, and in that regard there has been a lot of misinformation put forth both on the floor of the House and in the public debate.

General O'Neill last week testified that the Tiger Team report that was commissioned by the Secretary of Defense came back to him and said that for approximately $5 billion over 5 years, within 4 years a thin layer of protection that would guarantee 90-percent effective rate of no leakage could be deployed out of Grand Forks, which is the system that my colleague was referring to earlier, and that system would provide a limited layer of protection against a rogue missile launch or attack. That is really where the debate is focusing here.

As I think you can tell, the members are in agreement on theater missile defense, cruise missiles we are taking the comments of Dr. Bailey and think your testimony is going to see some results now in the Congress on that issue. We need to do more in that area, what we will have to talk to General O'Neill about in terms of what he would like.

But the issue of how quickly we should develop and then deploy a national missile defense is the key, and I want to talk about that for a moment. If you read the New York Times today, front page story, I'm sure you had a chance to see a story about what Iran has been doing in terms of a vast network of bringing nuclear arms into their arena. In fact, they have purchased an air base in Germany where they are following much of this through, and in the article it says—this is the front page today of the New York Times—Iran could have a nuclear capacity in 5 years.

Now we have heard from many of our intelligence people that is not possible, but here we now have a new revelation that Iran has a very robust program that is, in fact, giving them the potential to have nuclear capability perhaps even before the turn of this century.

I am very concerned about the efforts of Russia in the past 5 years to offer the architecture of their most advanced ICBM's, the SS–20 and the SS–25, to other nations for supposed space launch purposes. Now when I first started inquiring about this I got nowhere, people said we don't know anything about it, we can't comment about it.

In doing some research of some of the Russian publications, there is an extensive amount of information that the Russians have a had a very aggressive marketing program under way to make the SS–25 architecture available not just to Brazil but to any country that would pay the price.

Now some would say, well, they'll never pay the price, and I look at an Office of Technology Assessment report that came out at the last quarter of 1994 where one of the comments from the head of the equivalent of one of our laboratories, the Arzemas Laboratory, scientific director Vladimir Belugin said—and I quote—Iraq had offered the Arzemas facility $2 billion for a warhead.

Now I don't have verification that offer was made, but certainly the fact that he said that leads me to be concerned as to whether

or not there are efforts underway to purchase this technology by other countries, and if the Russians are offering this START program—which I am sure you are aware is what it has been called—what does that present to us in the way of a threat?

Let me take that hypothetical because I raised this point with General O'Neill last week. I said to him what if a Third World nation or some country like Iran or Iraq or one of our adversaries were to get control of one battery of SS–25's, three missiles with a potential for a warhead, or some type of device on each of those missiles, because that is typically the way the battery would be configured, mobile capacity to be launched. The Russians have announced the architecture is available for space launch purposes. They have also said, by the way, in their opinion it doesn't—making that architecture available doesn't violate the START Treaty because the original START Treaty said you couldn't use surplus equipment but now it has been changed where they can.

When I asked General O'Neill if a country were able to get access to the SS–25 architecture with three missiles do we have any protection for that, either an accident or deliberate launch, and he said no, none. What is the likelihood of that to occur given—I don't know whether you have seen all the articles in Izvestia, in Comsomolai Pravda, in all the publications internally in Russia, and the offerings they have made even to the point of hiring a Houston-based firm to market this technology around the world for them, and we all know in similar cases, for instance, our CIA has bought I think it is the SA–12 which was delivered to Huntsville, AL, and the New York Times editorialized about that.

So there is extensive documentation in the media that the Russians want to pursue the sale of this technology. So my point to you is, is that something we should be concerned with, or is that not really a threat, and if it is a threat, what do we do about it?

Dr. MILHOLLIN. The Missile Technology Control Regime [MTCR] would prevent them from selling finished systems of that kind to non–MTCR countries.

One of the difficulties we are having now is that the U.S. policy on foreign space launch systems is getting a little soft, and that again is a recent development. It was much stronger during the Bush administration. It is hard for us, the United States, to say that we are going to facilitate foreign space launch programs with exports, again, to produce a handful of jobs here and then at the same time tell the Russians they absolutely must not sell this kind of architecture to other countries.

So I guess my response would be that that would be very destabilizing. It would undermine the MTCR. We shouldn't let it happen, and we ought to get our own house in order so that we have some credibility when we are stopping the Russians.

I think we will stop the Russians. I think it is unlikely that that will happen, except perhaps in the case of China. China has been trying to upgrade its military missile program by buying things bargain basement prices from the Russians. I think the transactions to watch are the ones happening between China and Russia.

Mr. WELDON. I understand what you are saying, and in an article in Rusiskaya Gazetiya, the head of this START program in Rus-

sia maintains that, in fact, the availability of the START system will not violate any of the treaty provisions. So in their mind there is not a violation of the treaty provisions and therefore they can go forward and are aggressively doing so.

If you read some of the quotes by some of the leading—including Gaidar who personally approved this whole operation, his comments were, this is a tremendous way for what he calls defense conversion to take place in Russia and sees the potential of up to $10 billion of sales from the standpoint of exporting this technology. That is what concerns me, is the internal comments being made by Russian leadership relative to the availability of the SS–25 architecture.

Dr. BAILEY. That is right. The MTCR does allow for peaceful assistance, in other words, satellite launch capability assistance, and if the Russians do couch it in that light it is very likely that they will move forward and have a veneer of respectability over their sale.

I would like to point out though that even when sales have violated the MTCR the Russians have proceeded with them anyway. The Russians had an agreement to sell cryogenic rocket engines to India, and we protested vigorously on that issue, and the Russians purportedly backed off, but I have talked to Indian officials who have guffawed at the notion and said that all of the technology that they needed anyway was transferred, that Russia, rather than handing over the hardware, simply helped the Indians in making the hardware themselves. So the technology can and probably will be transferred anyway.

The bottom line is, I think that your scenario about potential sales of advanced rockets is very much a concern we should be alert to, and the amount of money that Iran is obviously willing to pay for weapons of mass destruction and delivery systems knows no bounds, and I think that the Russians are very vulnerable right now to approaches from the Iranians and we should be very worried about it.

Dr. PAYNE. The MTCR guidelines specifically state that the regime is not designed to impede national space programs or international cooperation in such programs as long as such programs could not contribute to delivery systems for weapons of mass destruction. So the issue becomes one of interpretation, as to whether what you are doing with regard to transferring space launch vehicles is going to contribute to the delivery systems for weapons of mass destruction, and so you can see the point, and I think that is what Kathleen was getting at, is the Russians could, in fact, say, well, obviously this is perfectly consistent with the MTCR, we are just engaged in cooperative exploitation of civilian space activity.

Mr. WELDON. That is my point, and I would just say, Mr. Chairman, to the ranking member, I plan to provide this documentation to all the members of the committee and hopefully the Congress and plan to do a special order on this.

Members have got to understand what is being talked about in Russia in terms of their emphasis on this particular initiative. How successful they will be I have no idea, but certainly if they are in the least possible way successful we have to look at the potential for a threat to emerge perhaps before the end of the century using

this technology for other than the intended purpose, which I admit is for peaceful scientific purposes for space exploration.

I know Mr. Hunter has some questions.

I want to ask a couple more questions about the SSN–22. Do you want me to go through those?

Mr. HUNTER. Go ahead.

Mr. WELDON. There was an incident involving the Ukraine. Last May the London Observer reported British intelligence claims that Iran had purchased eight SSN–22 Sunburn supersonic cruise missiles from Ukraine for deployment at the mouth of the Persian Gulf. Within a short time the Ukrainian Ministry of Foreign Affairs denied the reports. However, a report in Defense Week following that several months later indirectly cited U.S. Navy sources in support of the allegations. I haven't been able to determine whether or not that is true. This was reported, by the way, in the Office of Technology Assessment report.

Do any of you have any updated information on that incident and whether or not that, in fact, did happen?

Dr. BAILEY. Not that I can comment on here.

Mr. WELDON. It would have to be in a closed session, I assume, and, you see, that is part of our problem in this whole debate. Much of the foundation to lay for making this very controversial decision about national missile defense the intelligence community tells us we can't talk about or we don't have access to it. I had to go through hoops and hurdles to get these press accounts from the Russian media because our intelligence community didn't know whether I should have that information even though it has been in every major Russian publication, and even though there is extensive documentation, it is not 1 article, it is 15 separate articles, where they have talked about what their plans are in terms of this technology that we can't get access to, so we are being forced to make decisions, in my opinion, in a vacuum where members don't have access to data they need.

Mr. HUNTER. Doctor, could you be available this afternoon when we have the intelligence briefing on this at 2 o'clock?

Dr. BAILEY. I would not be the most appropriate person. I am a consumer of intelligence.

Mr. HUNTER. Well, you are what we have got.

Dr. BAILEY. I would have to get permission.

Mr. HUNTER. Could you try to get that before 2 and see if you can't sit in?

Dr. BAILEY. I will try.

Mr. HUNTER. Would that be good?

Mr. WELDON. That would be fine.

Let me pursue one other question, and this is on the whole issue of brain drain where the reports have been that the Russian scientists who have worked on some of the most sophisticated systems are, in fact, now working for both North Korea and China.

I mentioned in my opening statement the December 1992 incident at the Sheremetevo Airport which was well documented, well publicized, that 50 Russian rocket scientists from the Makayev Design Bureau were arrested as they were about ready to go to North Korea, and the report was they were offered tremendously high salaries, and while that particular incident didn't occur, it leaves one

to suspect this is probably going on on a regular basis and North Korea is basically getting this technology and getting scientists who worked on this technology from the Russians, and along with that we also have—this is also from the OTA report, I might add—that Russian scientists are now working for China both on site and via electronic mail for salaries in the range of $24,000 per year plus prerequisite some five or more times what they would otherwise earn at home. The Chinese media have reportedly claimed that up to 3,000 scientists have been recruited, and this is an article from the Far Eastern Economic Review in July 1993.

Would you comment on the movement of Russian scientists who worked on their nuclear capabilities and weapons systems, weapons of mass destruction, to both the North Korea and China.

Dr. PAYNE. May I comment just with regard to the missile program, because according to open source information, largely British and non-United States open source information, Russian technicians and scientists have been involved in the North Korean missile development program particularly with regard to the Taepodong series of missiles, and there is some speculation that because of the Russian involvement and possibly Chinese involvement this has allowed the North Koreans to advance very rapidly in this multistage missile arena whereas in the past the expectation was they would not advance that rapidly.

Dr. MILHOLLIN. With respect to Russia and China, it is, I think, a fact that the Russians have been helping the Chinese, and at bargain basement prices, in missile development, although that is not something that our Government likes to admit or likes to talk about publicly, because so far we haven't been successful in slowing it down, but it is going on, so far as I am informed.

Dr. BAILEY. The problem is actually far more complex than even it is outlined here, primarily because those who can't travel are doing it on the Internet instead. A lot of questions have been put on the Internet and then answered by scientists as far afield as even in Missile Valley in Los Angeles. There have been instances in which Iranians, for example, have put equations on the machine and asked, "Can you help?"

Recently a French nuclear official handed me a printout of a dialog that he had picked off the Internet where a French nuclear scientist, not really thinking anything about the proliferation problem, was answering questions from a Third World inquiry about nuclear weapons, and of course the French came down very hard on him. But the problem is so big that it almost boggles your mind. It is not just a matter of traveling people, it is people traveling on the Internet as well.

Mr. WELDON. One final question, and I think I know, Dr. Bailey, your position. You have stated that you think that in the scheme of things national missile defense is a priority, it may not be your highest priority, but it is something we need to look at.

I don't want to put words in your mouth, Dr. Payne, but I would assume that you too believe that national missile defense is a priority.

I have not yet heard from Professor Milhollin, but I would like to say, given what I have outlined here, given the Taepodong missile that North Korea is developing that our intelligence on the

record tells us may have a range of 5,000 kilometers, which could reach Guam or Alaska, not the mainland yet but one of those two sites, and if it were transferred could perhaps reach Israel, one of our key allies—given all of those scenarios, given the fact that the OTA has documented the theft especially up in the Murmansk naval facility of strategic materials that could be used to develop nuclear weapons, is there a need for us to look at national missile defense as well, even if it is a thin layer, if you could be convinced that that thin layer could be given to the point of a 90 percent effective rate? Is that worth exploring, or should we just ignore that as a threat of that kind of a system for America much like the Russians have around Moscow?

Dr. MILHOLLIN. Well, I must say that I am skeptical about it because I guess I look at it this way. If you are going to fight the giant who has a sword and shield and you are much smaller and you have your sword and shield, I think you are not going to walk out in the middle of the battlefield and take him on, you are going to poison him when he is asleep, or you are going to get him when he is not looking, or you are going to figure out some other way to win.

So I'm just afraid that with a thin, as you say, a thin capability, a thin layer, that people who want to do us harm will figure out a way around it, and that is what worries me, and I guess my response would be the same as it would be to the theater question. If you can do it and it is a reasonable price, then it is hard to be against it. It is just that technically I question whether it is feasible, and so if you just have x amount of money to spend, I guess if I were in your shoes I would be thinking more about intelligence and more about other things that might address the most likely form of attack, which I think, and as I said already, I think the ICBM is one of the least likely because of the retaliatory possibilities.

Mr. WELDON. I share your concern, and I am not a technical expert either, which is why I rely on people like General O'Neill to advise us, and once again his comments were from a tiger team report that I am sure you have heard of, that was commissioned by the Secretary, that have come back and said that a thin layer of protection which should be designed specifically for a single battery of, say, three SS–25's or, say, up to 10 missiles, that we could provide that for an investment of about $5 billion over 5 years; with the implementation it would take approximately 4 years at a rapidly escalating rate; and that beyond that the next thing he would recommend would be the space-based sensors which would allow all of our systems to be better able to note when a weapon of mass destruction was being launched around the world, and that for another $5 billion.

So we are talking about a $10 billion investment over some period of time, and that is a decision that we are now faced with, whether or not the threat warrants that kind of investment and whether or not there is a gap in protection.

I happen to at this point in time come down on the side that yes, there is a gap, that I can't certify to my constituents that we can protect our mainland, let alone our troops, from the threat of what I think is a very real and increasing emergence of missiles, and so

I come down on the side that we should be exploring that in a robust way. I don't want to throw vast amounts of money, as we did perhaps, in the last 15 years, I want to do it in a methodical way, but that is why we have you all here, to help us go through that, because that is at the heart of where the debate is in the Congress, as you well know, is to whether or not we should deploy or move into a national missile event, how quickly and how much money that should take if there is, in fact, a threat there, which is part of what you have helped us work through today, and with that I'll turn it over to the chairman.

Mr. HUNTER. I thank the gentleman and thank him for his leadership on this issue.

Ladies and gentlemen, we really appreciate your being with us today, and let me engage for a minute with my—some of the ideas that my colleague, Mr. Dellums, offered, having heard your testimony, because your testimony went far beyond just what those of us on procurement and R&D are interested in.

We build things, we develop things, and hopefully at some point we field things, but you talked about the broad range of threats that proliferation can manifest and everything from the tennis-ball-sized element of biological killer or chemical killer all the way up to the ICBM, and let me just ask you if I am missing something, but my understanding is that what you have said is, there are what I would call, at least what Dr. Bailey mentioned and Dr. Payne mentioned and you, Professor Milhollin expressed some reservation with respect to the technical aspects of.

But let me, Dr. Bailey, start with you. You talked about the need to meet this array of threats, export control—what I would call the big five—export control, diplomacy, intelligence, theater missile defense, and that would include cruise missiles, and national missile defense, and that would include cruise missiles, I take it from, presumably—presumably from submarines or something that could get close enough to the United States. Is that an accurate description of the big five?

Dr. BAILEY. Yes.

Mr. HUNTER. OK.

Dr. Payne, do you agree with that, basically that array?

Dr. PAYNE. I would add a big six, and that is deterrence.

Mr. HUNTER. Deterrence.

Dr. PAYNE. I would add deterrence to the package.

Mr. HUNTER. OK. Excellent. Thank you. So let's say the big six.

Dr. Milhollin, do you basically agree that those are the elements of defense against the challenge of proliferation?

Dr. MILHOLLIN. Yes, I would agree.

Mr. HUNTER. OK. Let me ask this question as a followon. Your testimony has been to the effect that technology transfer is not now working, and we know that for a number of reasons, and this committee is probably your best friend in that area and the best friend, I think, of the American people, but we see that our allies are going whole hog on selling things to everybody, that the pressure is always on the basis that we can't hold back old gym socks, that we can't sell to our adversaries, and when the companies aren't not selling old gym socks they want to sell complicated stuff. But that

is the argument that they always make to their colleagues to get these votes.

It appears to me that export control is deteriorating so that is not working, and, Professor Milhollin, you and Dr. Payne and Dr. Bailey have all testified as to present examples of leakage and hemorrhage that is very dangerous right now. So that has not been working.

You have just testified, Dr. Milhollin, to the effect that the diplomatic route—and you too, Dr. Bailey—that we have been following with respect to North Korea has left them in the position of being greater outlaws than they were before and being rewarded for. So I would say that is at least some evidence that that element, diplomacy, is not working, at least not working effectively, and with respect to intelligence we know that our intelligence budget has gone down some and that the resources are not being allocated on a national level to do the extensive intelligence work that we are going to need, which will largely involve human resources with respect to that small room that Dr. Bailey talked about where you are making biological or chemical weapons that takes a very small space and has no unique features for national technical means to observe.

So the intelligence—it appears that we can't expect increased resources for the intelligence community for this function in the near future.

Now do you folks generally agree with that, that things aren't going well in those areas, they aren't as effective as they should be?

Dr. MILHOLLIN. I think we could do much better if we simply put a high enough priority on it.

Mr. HUNTER. I agree.

Now let me just put our question as the procurement and R&D subcommittee. Those other elements of the big six—and of course with respect to the six when we know where deterrence is with respect to our nuclear arsenal and the arms treaties that are past and those that are pending, but with respect to those, understanding that export control is not working effectively right now, diplomacy is not working effectively right now, intelligence resources are going down, you are appearing before the procurement and the R&D subcommittees, and we build things, and so understanding that there are other shops that you go to in this building to make the pitch for more intelligence dollars, to make the pitch for increased diplomatic and a new course in diplomatic relations in this area, to make the pitch for export controls, and that would be the full committee here, where the ranking member and the chairman have done a marvelous job in holding the line, but understanding that you are before our little shop right now, we build things, and we field them hopefully at some point, do you advise us as a procurement and R&D subcommittee to do the one thing that we are capable of in our subcommittee in this area, our niche, and that is to build theater missile defenses, cruise missile defenses, and national missile defenses, should we go forward?

Dr. Bailey.

Dr. BAILEY. Yes, you should, but you also build detectors for battlefield detection of CBW agents and other things, and so I hope that you will keep that in mind. I know this is about missile de-

fense, but there are many other technologies that can and should be funded.

Mr. HUNTER. OK, and could you, as an adjunct to our hearing, give us a little memo on that?

Dr. BAILEY. Yes.

Mr. HUNTER. I know our time is going to run, but we are interested in that too.

Mr. HUNTER. Professor Milhollin.

Dr. MILHOLLIN. I agree that the three questions you have posed or the three items you have posed for response, theater defenses I think are appropriate in some cases; cruise missile defenses, yes. I certainly second the idea that we have spent too much time thinking about ballistic missiles and not enough time thinking about cruise missiles, and we need to think about cruise because I think they are going to be the weapon of the future, and not the ICBM.

As far as the national, I guess I have already responded to that.

Mr. HUNTER. Well, let me make a little subset question for you, because you are talking about either/or and prioritization. If you assume that we are going to fully fund theater missile defenses and do everything we can to make that program as robust as possible and that we will fully fund and make the cruise missile defenses as robust as possible, then comment on the national missile defense so it is not now competing with one of the other two that you mentioned.

Dr. MILHOLLIN. Well, I guess my comment would still be that it is just a question of feasibility, and whether you can achieve the goal that you are setting out, whether you can prevent somebody from putting one missile on New York or some other city that the other person can choose and any time they choose, I think that is a tough task.

Mr. HUNTER. But if we could reasonably accomplish it, would you be for doing it—effective missile defense?

Dr. MILHOLLIN. If it could be effectively done at a reasonable cost, of course I would be for it, but I think those are big assumptions.

Mr. HUNTER. OK.

Dr. MILHOLLIN. I would like to say though that I think the example of North Korea and Iraq has shown that if you are building things, and your question is what kind of defense dollars can we spend, I think we need to be able to counter these threats by projecting our conventional military forces.

If you look at vary scenarios in North Korea about what might happen and what we might do—and I have done several of these with military personnel—you come down to the result that you have the maximum amount of flexibility and the best chance of coming through it OK if you have a good conventional force that you can project, and I think that was true in Iraq and it is going to be true around the world.

Mr. HUNTER. OK, and let me just stop you on that question before we go to Dr. Payne. Up to the last several years we have had a very big stick, and the stick was created during the Reagan years when we built the monster, and a term that some folks have used who didn't agree with it, a massive military apparatus that had

plenty of conventional fire power, new armor, had new fixed-wing—large numbers of new-fixed wing and rotor-wing aircraft and almost all the components of conventional warfare, was a very robust big stick military. We saw that big stick military win an overwhelming victory in the Gulf.

Now it has been argued by those who say that we need to downsize because the world has downsized—in fact, one argument used by them is to say well, wait a minute, if we look at all the money that is spent in the whole rest of the world for defense, we spend more than all the rest of the nations of the world put together, and therefore we don't want to spend more, and they would tend to view what we need to have in terms of a balanced scale, and if you put what we have got on one side of the balanced scale in terms of conventional forces and what the other side has on the balance scale and we are just about equal, then that equality spells stability.

Now I want to ask you this question. Do you think that because of this new array of threats that can come from a small group that can make a tennis-ball-sized biological weapon and deliver it clandestinely, that the array of threats goes from that all the way up to a superpower with an ICBM, do you agree that we—that it might be a good idea to keep, quote, the big stick, that is, massive superiority in conventional weapons, or should we go to the equal stick, the parity, balanced scale approach? Have you thought about that one?

Dr. MILHOLLIN. I haven't thought about that. It is kind of outside of my field, but I would say that from what I know about the cold war we should think about taking the money or some of the money that we have spent on big systems to deter the Soviets and put that money into forces that we can project in areas where proliferation is likely to occur.

Mr. HUNTER. Describe those.

Dr. MILHOLLIN. Well, I think you have got to be able to deal with North Korea without using nuclear weapons.

Mr. HUNTER. OK.

Dr. MILHOLLIN. And you have got to be able to go into the Middle East. If things get out of control, you have to be able to go in there.

Mr. HUNTER. So you would have lift, air lift, sea lift——

Dr. MILHOLLIN. Well, again, this is not my expertise.

Mr. HUNTER. OK. But whatever it takes to get troops in.

Dr. MILHOLLIN. I think you have to do what it takes to be able to solve those problems without using nuclear weapons. I am not advocating that we increase the defense budget.

Mr. HUNTER. I'm trying to get you there.

Dr. MILHOLLIN. I know you are.

Mr. HUNTER. But I'm trying to be realistic because I appreciate your position. Are you aware of the fact we have gone down from 18 divisions to 10 divisions, Army divisions?

Dr. MILHOLLIN. I don't count the divisions.

Mr. HUNTER. I mean you are a realist. You are the guy that comes to us and tells us, "Boy, you guys are getting a lot of happy talk on export control." It ain't happening, and I just want to let you know, being a reciprocal realist, that if you are talking about somehow supplanting the big strategic expenditures with conven-

tional expenditures, that is not happening. We are drawing down massively in all areas. Strategic expenditures are about 13 percent of our defense budget, and so they are not a massive area that can be transferred easy, and in the conventional areas we have drawn down from 18 divisions to about 10 divisions, we have massive shortfalls in air lift and sea lift, and it doesn't appear that we are going to be making those up soon.

So what I am asking you, you have got to at some point—what we have to do is transfer our policies into numbers. You think there is some value in having a large conventional force that can be moved quickly. Is that what you are saying?

Dr. MILHOLLIN. I guess I would say that there is a big advantage in being able to go into regions where proliferation is likely and solve the problem without using nuclear weapons ourselves, and whether that takes a larger force or smaller force I'm not prepared to say, but I do think that the American people would be better protected if we took the dollars we have spent, some of the dollars we have spent on big strategic systems aimed at the Soviets, and transferred them. Perhaps that is not the answer you want, but that is my honest answer.

Mr. HUNTER. Well, the one reason you folks are here, and we appreciate you, is because you are candid and you have got a high intellect, and you make us think, and we appreciate it.

Dr. MILHOLLIN. Because the threat is changing. The Soviet threat is not there, and we have got to—if we don't want to follow the Soviets into the economic trash can, we have to be nimble and we have to be able to switch our budget around rapidly in response to world events.

Mr. HUNTER. OK. I appreciate that.

Dr. Payne, and I didn't mean to digress on that second question, but it was too tempting, so could you answer that first question?

Dr. PAYNE. Yes, happy to. With regard to the six measures, and I think in the last conversation we added a seventh, and that is military operations, so it is a big seven I believe is accurate to say. All of these are inadequate in and of themselves, and all of them are necessary to fit the hole.

But let me just mention very briefly why I think missile defense, both national missile defense [NMD] and theater missile defense [TMD], are such important parts of the big seven. Without missile defense, it is difficult to do some of the others. In other words, we have been talking about military operations and force projection into regional arenas if necessary. I don't know how you do that if your forces are threatened by ballistic missiles and weapons of mass destruction, because you are not going to send the forces in there in the face of that threat unless you can deal with that threat.

How do you by diplomacy pursue missile nonproliferation unless you can devalue the missiles by having a missile defense system that helps reduce the value of the missiles that the proliferant states want? How do you get involved in deterrence, in trying to deter other states, unless you can protect yourself from their retaliatory threats? In other words, missile defense is an important part of this package, the big seven, just because it helps the other fac-

tors work themselves and it provides some security for you in case those other factors fail.

Mr. HUNTER. I thank you, and with our tradition, our long suffering ranking member of the full committee has been with us for this entire hearing. We are privileged to have his presence at our procurement and R&D hearings, and I know we have got to be out of the room in a little bit, but let me just ask the gentleman from California if he has any final thoughts here.

Mr. DELLUMS. First, I raised my questions first. Since I'm the last Democrat standing here, I would like to thank all three of the witnesses for their intelligence as well as their stamina and endurance and just make two final observations.

Mr. Chairman, you put the question to Dr. Milhollin with respect to 10 as opposed 18 divisions. Maybe that is not the question. Maybe the question is not, do we go from 18 to 10, but what do you want a division to do in a changing world, and how many of them do you need? You may end up saying that the answer is 10. So I think that there is a policy, substantive analytical approach, that one takes to get to those numbers.

Second, I appreciate all three of your testimony with respect to the danger of cruise missile technology. I have served in the Congress for 24 years, and I think maybe Mr. Hunter may recall back in the late seventies and early eighties I said to my colleagues that some day we will reap the wild winds of the technology that we are pursuing; developing and deploying cruise missiles may very well have changed the world for all time. And it seems to me that what your testimony is about is, that is exactly where we are, and that is, it is a technology that can be pursued much more cheaply and much more readily, and it seems to me that with our urgent desire to engage in sea launch, air launch, ground launch cruise missiles, that all that technology now slowly but steadily and surely is beginning to turn back toward us and may very well hit us not from some standardized attack approach, but I would tend to agree with Dr. Milhollin, that may very well come from a more terroristic effort. It is tragic, but those are the realities, and I thank you for your generosity, Mr. Chair, and I thank our distinguished witnesses for their contribution to these proceedings.

Mr. HUNTER. I thank the gentleman, and this hearing is concluded, and we are going to be back at 2 o'clock with some intelligence folks, and we hope, Dr. Bailey, you could be with us at that time too.

And, gentlemen, if Dr. Payne and Professor Milhollin would like to be here, assuming we have got everything that we need administratively, we would love to have you folks stick around. We like to have controversy and make trouble. So that is why we want our folks to stick around here.

[Whereupon, at 1:02 p.m., the subcommittees were recessed, to reconvene in closed session at 2 p.m.]

NUCLEAR ATTACK SUBMARINES

HOUSE OF REPRESENTATIVES,
COMMITTEE ON NATIONAL SECURITY,
MILITARY PROCUREMENT SUBCOMMITTEE,
Washington, DC, Thursday, March 16, 1995.

The subcommittee met, pursuant to call, at 2 p.m., in room 2118, Rayburn House Office Building, Hon. Duncan Hunter (chairman of the subcommittee) presiding.

STATEMENT OF HON. DUNCAN HUNTER, A REPRESENTATIVE FROM CALIFORNIA, CHAIRMAN, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. HUNTER. This afternoon we continue our review of the administration's fiscal year 1996 budget request. The No. 1 priority in this year's Navy procurement request are nuclear attack submarines; not just one submarine, but two; the SSN–23 *Seawolf* and its follow-on new attack submarine.

These two platforms by themselves represent more than 20 percent, or almost 20 percent, about $2.2 billion of the procurement dollars in the Navy's 1996 budget. Today's hearing will, in format, replicate what we did a couple of days ago with respect to other segments of the industrial base.

In fact, in that hearing we examined six segments of the defense industry that are being severely impacted by what we call a procurement holiday which has been in effect at DOD since this administration took office.

We heard from both senior military officers who discussed equipment requirements for their services that were not being met for lack of funding and from industry participants who addressed the effect this lack of funding for identified requirements was having on their industry's viability.

One segment of the industrial base that the earlier hearing specifically did not address was the manufacturing of nuclear attack submarines. This was done for a couple of reasons. First, unlike the case for the other six industry segments we examined, the Department is determined this segment to be of such importance as to justify funding $2.4 billion for construction of an attack submarine that in some quarters is described as not being required for war fighting purposes, but rather is being acquired solely to preserve the production base.

No. 2, the topic was of sufficient interest to warrant a separate hearing. I think the attendance validates that thought. In reaching its decision of whether or not to fund the SSN–23 as a production gap bridge to the new attack submarine, the subcommittee is going

to be faced with the same vexing question as confronted the framers of the Bottom-Up Review.

That is, is the Nation's interest best served by retaining two nuclear capable shipyards in view of the long-term requirements for nuclear submarines and aircraft carriers?

If the answer to this question turns out to be no, it may affect the need to continue the SSN–23. It may affect the need to start the new attack submarine as currently planned. It may affect the cost cap the Congress mandated for the first two *Seawolfs*.

If on the other hand the answer turns out to be yes, then all options available to bridge this production gap, even those rejected by the Department should be explored. Also, the possibility of subsequently the (NAS) new attack submarine, or sharing construction of this system as is currently being done ont he DDG–51 Aegis destroyers should be addressed.

As my colleagues can see these are not trivial questions. As in the earlier hearing, we have invited both department and industry witnesses to help us address them. However, we have also asked representatives of two other organizations that have done considerable research into nuclear attack submarine issues to join us as well, the Congressional Research Service and the General Accounting Office.

The hearing's purpose is to broaden our perspectives on the requirements for attack submarines, on the industry's preservation problem, and on various alternatives for dealing with this problem. To you, gentlemen, believe me we are going to use you thoroughly today.

Joining us this afternoon are an old friend of the Committee, Hon. Nora Slatkin, Assistant Secretary of the Navy Research, Development and Acquisitions. Nora, thank you for being with us.

Ms. SLATKIN. Thank you, Mr. Chairman.

Mr. HUNTER. We also have Mr. W.P. "Bill" Fricks who is president of Newport News Shipbuilding; Mr. James E. Turner, CEO, General Dynamics Electric Boat Division; Mr. Richard Davis, Director, National Security Analysis of the U.S. General Accounting Office; Mr. Ronald O'Rourke, specialist, National Defense Congressional Research Service, Library of Congress.

We have with us on the first panel with Ms. Slatkin, Adm. Bruce Demars, Director, Naval Nuclear Propulsion and Rear Adm. Dennis Jones. We want to welcome you. Thank you for being here. Let me just say before we start out a couple of things.

First, I did not give enough credit to our staff leader on the Procurement Subcommittee, Mr. Steve Thompson, for his work at the last hearing. I thought it was excellent to have an exchange, not only with Members, but between members of the panel itself with a part of that panel being composed of uniformed leaders and a part of that panel being composed of industry leaders in this last hearing that we had on the industrial base and on requirements.

We had, I think, excellent exchanges that possibly could not have taken place to the degree that they did in any other forum. I thought that was excellent. I want to thank Steve for really instead of being a trouble maker, Steve, you have done a great service to bring various points of view to the table.

I want to thank you for that. I think your son, Brent, is in the audience here. We will try to get you out early enough to be able to go play golf with him. Is he in here today? Excellent. Good to have you here. We are proud of your dad. He may survive this session. Let me thank you, Steve, and the people who put this together.

Second, let me just say to our witnesses, to all of them, most members that are here understand and have read the base issues with respect to the submarine questions. What we need to do, we have a limited amount of time. We have members who are missing aircraft, and times with their family, and in their home districts to be here.

We want to sharpen the issues. We want to dispense as much as possible with the boiler plate that I, myself, am often guilty of laying out in testimony. I think you can presume some modicum of expertise on this issue and understanding by the members of the committee.

What we want to do is get right down to the brass tacks. We have got some very difficult issues before us. The security of the nation largely rests on some of the decisions we make. To Nora Slatkin, an old friend of the committee and now a leader in this Administration. Welcome. Nora, the floor is yours.

Ms. SLATKIN. Thank you, Mr. Chairman.

Mr. HUNTER. Please excuse me; my old friend from Missouri.

Mr. SKELTON. I would never interrupt Nora Slatkin.

Mr. HUNTER. Mr. Skelton, you have got it right. Let me ask Mr. Skelton who is the ranking member on the Procurement Subcommittee, the fine gentleman from Missouri, if he has anything to say to the committee?

STATEMENT OF HON. IKE SKELTON, A REPRESENTATIVE FROM MISSOURI, RANKING MINORITY MEMBER, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. SKELTON. First, let me compliment the chairman twice; No. 1, for having this hearing and No. 2, for learning how to pronounce the name of my State correctly. That is appreciated more than you know.

Very quickly, the United States does not have a luxury that some other countries have in setting forth its military priorities. So much of what we do is based upon the budget. As everyone here knows, I have proposed a budget larger than that has been sent over by this administration which I think is $44 billion short over a period of the next 4 years. It is my intent to do the best I can to see that it is increased at least that much.

Some countries have the luxury of putting all of their eggs in one basket such as submarines, such as theater missiles, scuds, and the like. We, because of our position in this world, must be able to meet each of the different threats. Of course, that plus force structure, quality of life, trying to keep good people in uniform all have to have those balls kept in the air at the same time.

This is one major piece of that jig saw puzzle, but not the only piece. We have two—before us which we will be asking questions of. No. 1 is, do we continue the SSN–23 with the expenditure of several hundreds of millions of dollars?

Second, what does the future hold for the submarine force, particularly in looking at the industrial base? Do we place it in State-A or State-B or do we have them compete? Where do we go? These are extremely far reaching and difficult decisions.

I can think of none better as a professional here or as now someone on the other side of the table giving us thoughts and advice, Nora Slatkin. It is a personal thrill to welcome you, Admiral Demars and Admiral Jones, both old friends. We thank you for joining us.

Mr. HUNTER. Secretary Slatkin, the floor is yours.

STATEMENT OF HON. NORA SLATKIN, ASSISTANT SECRETARY OF THE NAVY, RESEARCH, DEVELOPMENT AND ACQUISITION; ACCOMPANIED BY ADM. BRUCE DEMARS, DIRECTOR, NAVAL NUCLEAR PROPULSION; AND ADM. DENNIS JONES, DIRECTOR, SUBMARINE REQUIREMENTS

Ms. SLATKIN. Mr. Chairman, members of the committee, thank you very much for the opportunity to come appear before you to discuss the Department of the Navy's submarine program and our budget request. It is indeed a pleasure to be back home.

As you mentioned, Mr. Chairman, I am accompanied by Adm. Bruce Demars, the Director for Naval Nuclear Propulsion; and Adm. Dennis Jones, Director, Submarine Requirements. They are here to answer any questions that you may have.

With your permission, Mr. Chairman, I would like to submit my statement for the record and make some brief remarks.

Mr. HUNTER. Without objection, any and all statements by witnesses at this hearing will be accepted into the record. Thank you.

Ms. SLATKIN. First, let me report to you that the three R's that underscore the Navy's program, readiness, right sizing and recapitalization are serving our Nation and our Navy well. From my vantage point, our recapitalization program is on track. We must see that it stays on track.

Beginning in fiscal year 1996 our recapitalization focus must shift to support our long-term weapons systems modernization program. Procurement accounts must be sustained as planned over the long period in order to support modernization.

We are laying the ground work for that modernization. Frankly, that brings us to this topic today; modernizing our submarine force. I would like to talk to you about this program in three parts.

First, our requirements. Second, our important near-term decisions that you mentioned, Mr. Chairman. Finally, our smaller, more affordable new attack submarine. Our forward from the sea naval strategy that I know you have heard about from the CNO, the Secretary and the commandant imposes requirements on our attack submarine force.

First and foremost we must maintain our under sea superiority; a longstanding dominance we have enjoyed as a nation. Yet one that is becoming more challenging to preserve with the changes in the world threat.

Covert Tomahawk launches, intelligence collection, surveillance, special operations, Marine amphibious battle group support and mine warfare are all mission capabilities of growing importance for our submarines deployed to littoral regions around the world.

With a leaner submarine fleet, with a leaner and smaller submarine fleet, multimission versatility must be an inherent quality in all new submarines we build to face tomorrow's warfare challenges.

The challenge of maintaining undersea superiority and multimission effectiveness is compounded as you look at the changes in the world threat. What this slide shows you is that there are about half a dozen Russians submarines that are operational today that are quieter than our improved 688 submarines.

This is a historic first and frankly one that we are anxiously determined to reverse. In light of these mission requirements and advances in both nuclear and modern diesel submarines, the Bottom-Up Review directed a force structure of 45 to 55 submarines.

The Joint Chiefs of Staff have required that we have 10 to 12 submarines as quiet as *Seawolf* that are operational by the year 2012. Our long-term answer to these requirements is clearly the new attack submarine.

Our near-term strategy is to establish stable serial production of this more affordable submarine as quickly as possible and effectively as possible. We know where we are headed with our attack submarine program.

The issue before us today, frankly, is how best do we get there? When we look at our submarine authorization profile as it is depicted here on this chart, we see our first challenge. I think you all will agree, it is a formidable challenge. What is the most cost and time efficient way to meet our requirements?

I know all of you are quite familiar with history. We have all lived through this history. Our last submarine was authorized in 1991. It will not be until 1998 that you authorize the new attack submarine. Unless we do something about this, we cannot get there from here.

A 7-year gap is just too long. We must act to preserve or create new submarine construction capability. The question for all of us today is what is our best course of action? We have looked the alternatives.

We looked at bridging the gap by producing selecting submarine components. That is option 1 up there. That does not adequately support ship design or construction. At the end of the day, it produces no war fighting capability.

We looked at overhaul and new construction of 688 submarines. That is option 2. That, too, fails to preserve needed ship design skills. It does not meet the threat in the years to come.

We looked at smart shutdown and restart. We looked at a kind of life support approach for the Groton shipbuilder. These cost money, entail significant risk and at the end of the day, produce no war fighting capability.

We looked at closing down one nuclear capable builder and starting over again at another; abandoning our previous and promising design build approach. That is a new approach that we are using with the new attack submarine which I am anxious to have you understand. That, too, option 4, has significant drawbacks.

Finally, our analysis pointed to one solution that we believe and that I believe you will believe is the best solution for the near-term

challenge and long-term affordability of our program; one that satisfies current Navy needs and accommodates our industrial base.

That option is to use SSN–23 as the production bridge. This decision does a number of very good things for us. It provides us two nuclear capable shipbuilders and that is the key to maintaining the potential over the long term for competition.

It also provides us with a submarine for the money that we are going to spend. No other alternative that we are going to discuss today does that.

Perhaps most importantly, building the SSN–23 represents the least risk to the Nation's capability to continue building submarines. You can see on this slide how this solution stacks up against a couple of other alternatives, and alternatives I know you are going to want to talk about today, Mr. Chairman.

Keeping Groton alive without SSN–23 could cost as much as $1 billion and we get no warship. Although we would still be able to maintain two nuclear capable shipbuilders, that is not enough for our money.

Shifting the whole effort to Newport News as you see in the third column would potentially cost more than keeping Groton alive in the near term. We would have additional costs we really cannot quantify. We would foreclose competition over the long term. At the end of the day we would still have no warship.

We believe the case for building *Seawolf,* SSN–23, as a production bridge is compelling. Let's look in a little more detail at how SSN–23 provides the bridge between where we are today and where we believe we need to be.

The new attack submarine right now supports all vital categories of design work at the Groton Shipyard. It supports nuclear component procurement. What it does not support are preservation of those critical submarine construction skills and the nonnuclear component manufacturing skills.

These are use-them or loose-them propositions. As we saw on the last chart, it makes the most sense to use them building a new submarine. Having and maintaining two nuclear shipbuilders has broad implications as well.

With only one of them we loose the capability of ramping up submarine construction. We loose protection against natural disaster or economic disaster and we loose the potential for future competition.

This next slide shows you how we plan to implement our policy of maintaining two nuclear shipbuilders. In reality, this is not just about building submarines. This is about building nuclear powered warships. Groton will initially build submarines and Newport News will build and refuel aircraft carriers.

We are already underway, thanks to your support, in executing this strategy with the award of CBN–76 at Newport News last fall. As previously mentioned, we are capitalizing on our integrated design, build approach for the new attack submarine at the Groton Shipyard.

Most importantly though, our plan provides a single point of accountability for the new attack submarine design, build approach at the Groton Shipyard while maintaining the option for potential competition.

At a much earlier stage than usual, we entered into a partnership with our shipbuilder at Groton on the new attack submarine. This meant the design of the new attack submarine was specially tuned to the business and construction practices at Groton.

Members of the design team, the builders and key vendors were colocated at Groton early on in the kind of integrated team we are seeing the benefits of throughout our industry. This enabled us to focus early on affordability and has accounted for some very impressive progress so far.

Remember I told you we are trying to build an affordable new attack submarine. Focusing early on, on affordability is the key to success here for the long term. Any change to this approach is going to increase our program cost.

The next critical step to follow in our plan is completing the SSN–23. This production bridge is the most time and cost effective way to get to production of the new attack submarine. I hope you will agree with me, the new attack submarine is what we need for the future.

Finally, the new attack submarine is being designed for post-cold-war mission requirements. We are designing in affordability. We are designing it by making it mission adaptable and technology adaptable.

It is designed to be all of these things and it will be. It will be approximately 30 percent cheaper than the *Seawolf*. It will be cheaper because we focus technology, not just on performance which is what we have always done.

We focused technology on costs. That is a big difference in the way we are doing business. It will be cheaper because we are making the tradeoffs to make it cheaper. Speed and payload, as I testified last year, are two examples of where we have really traded off cost reduction for capability.

The bottom line is that we have achieved the best balance in this submarine between cost and capability. That is just our view, the Navy Department's view. That has been shared by the Department of Defense as well as independently confirmed.

Well, Mr. Chairman and members of the committee, that is our program in brief. If I could leave you with one thought today it is this. We have really taken a thorough look at what we need. We have come up with the right solution, I believe for the near term and for the longer term future.

We have come up with a program that may not be the cheapest, but is the most cost and time efficient program we could get to get us to the long term. We ask for your support.

Thank you very much.

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HOUSE NATIONAL SECURITY COMMITTEE
PROCUREMENT SUBCOMMITTEE

STATEMENT OF

THE HONORABLE NORA SLATKIN

ASSISTANT SECRETARY OF THE NAVY

(RESEARCH, DEVELOPMENT AND ACQUISITION)

BEFORE THE

SUBCOMMITTEE ON PROCUREMENT

OF THE

HOUSE NATIONAL SECURITY COMMITTEE

ON THE

FY 1996 NAVY SUBMARINE MODERNIZATION PLAN

MARCH 16, 1995

NOT FOR PUBLICATION UNTIL RELEASED BY THE
HOUSE NATIONAL SECURITY COMMITTEE
PROCUREMENT SUBCOMMITTEE

Mr. Chairman, distinguished members of the House National Security Committee, thank you for this opportunity to appear before you to discuss the Department of the Navy's Submarine Program and Fiscal year 1996 budget request.

In my testimony today I will make three main points:

First, the changes brought by the end of the Cold War mean significant changes for our attack submarine program. We must maintain undersea superiority, but we are putting new emphasis on a variety of missions to deal with the demands of this new era.

Second, we have the right platform for the future with our smaller, more affordable but very capable New Attack Submarine. The application of technology to reduce cost, and the emphasis on flexibility and modularity to adapt to new missions mark a significant change in focus from our past Cold War priorities.

Third, we face a near-term decision on a production bridge to move us from where we are today to where we need to be to begin production of our New Attack Submarine. We have exhaustively examined this issue in studies within the department and without. Our analysis shows us that one solution gives us both the best return on our money and allows us to best prepare for the future. That solution is using construction of the SSN23 as the production bridge to the New Attack Submarine.

To support these points in detail, Mr. Chairman, I have divided my testimony into three main parts. First our mission requirements; second, our New Attack Submarine program, and third, the important near-term decisions for submarine recapitalization.

I. THREAT AND MISSION REQUIREMENTS

Why Submarines?

Before discussing the specifics of the submarine recapitalization and modernization plan it is worthwhile to review the value of submarines. Why do we need them? What do they do?

Their most enduring characteristic is STEALTH. As in any form of warfare, the ability to remain undetected or camouflaged from the enemy is of prime importance. Today, and perhaps more so in the future, submarine STEALTH will translate into two major warfare enhancements.

o The submarine can perform its peacetime forward deployed missions in a non-provocative fashion, thereby minimizing confrontation and diplomatic escalation.

o The submarine can perform these missions in the midst of anticipated threats without a defensive network for self-protection.

The SSN operates without a "logistics tail" -- routinely remaining at sea without re-supply for months at a time. It is constantly ready to perform all of its multiple missions and is capable of performing several simultaneously. With the advantages realized from nuclear propulsion it responds instantly to tasking.

Submarines are usually the first naval platform to arrive on station and can remain there unsupported. This presence provides full spectrum tactical intelligence collection and provides on the scene indication and warning of an adversary's actions. Armed exclusively with an offensive payload, they provide firepower for land attack and sea control.

The Need for Superior Submarines

Clearly, the need for dominance in submarine warfare did not end with the Cold War: Russian technological advances continue to challenge our superiority. And with the global proliferation of diesel submarines the need for quality submarines remains great. Countering this worldwide threat is justification alone to warrant continued dependence on this weapon platform. But there are even more compelling needs:

o As long as other nations maintain the ability to launch ballistic missiles from submarines, we will need attack submarines -- they are our primary, and sometimes only, conventional means of holding this threat at bay.

o Our attack submarines provide critical national intelligence and surveillance information. The fact that a submarine can collect this information while "invisible" to the regional aggressor is another indicator of their strategic importance to the nation.

o The same cases can be made for the unique contributions submarines bring to regional conflicts and strategic deterrence, as well as, the enabling

role they play for joint forces as they covertly prepare the littoral battlespace for the entry of follow-on forces.

The Uncertain Russian Threat

The entire Russian military has been affected by dire economic conditions. However, within the Russian Navy the submarine force has been far less affected than the surface force. Their submarine research, development and construction programs remain aggressive. We cannot afford to lose sight of this reality as we concentrate on regional conflicts and third world capabilities. Without implying sinister intent or purpose on their part, we, as a maritime nation, should remain committed to not ceding undersea superiority to any other power.

Out of area Russian submarine activity is lower than Cold War levels. However, a recent demonstration of Russian submarine potential occurred in July 1994. An OSCAR anti-ship missile submarine left its home waters and intercepted two US Carrier Battle Groups operating in the Western Pacific. This episode reflects a Russian desire to maintain a world class submarine force. The ultimate future of the force will depend on economic recovery, the Russian Navy's claims on defense resources, and the out come of the Russian debate over the future of the nuclear triad.

As other nations develop submarine expertise, incidents such as this are likely to occur. Nations with nuclear submarines are capable of interdicting shipping on the open seas while those with conventional submarines can deny freedom of navigation through geographic choke points and transit lanes in proximity to their shores.

Russian Submarine Quality Improves

Russia has placed a national priority on quality submarine forces - both attack and ballistic missile - retaining a formidable force of over 180 capable nuclear and diesel submarines today and projected to be building toward a quality force of 20 ballistic missile submarines, 60 nuclear attack submarines (including 14 SSGNs) and 40 diesel submarines by early in the next decade.

With increasing dependence on the submarine force for executing their nuclear missile strategy, the Russian commitment to develop the most advanced technologies in their submarines continues unabated. Their national resolve to field highly capable attack submarines hinges on this national policy. The Russians frequently deploy their SSNs

as protective assets for their SSBN force and as such they recognize that these assets must be equal if not better than U.S. submarines.

With the introduction of the Improved AKULA submarine, the Russians have seized the lead in submarine acoustic quieting. Later units of the AKULA Class submarine have been backfitted with advanced quieting equipment. These hulls are quieter than our best 688Is. Additionally, submarines with equivalent or better quieting are in construction. They will retain the status of having the quietest submarines in the world until the SSN-21 is delivered in 1996 and becomes operational around 1998.

Threat Proliferation to Littoral Nations

The threat is not limited to Russian submarines. The Chinese submarine force is the third largest in the world and includes six nuclear powered submarines. Of particular concern to our Navy is the increased proliferation of advanced weapons systems, especially diesel submarines and mines to other countries. Third world countries can produce diesel submarines or procure them from Russia or Western Europe. Mines are also widely available on the world market.

At present there are more than 40 countries that maintain and operate diesel submarines. Although the combined inventory of over 350 submarines includes many antiquated submarines, there are approximately 25 modern diesel submarines in construction throughout the world today. Some of these non-nuclear submarines are available for procurement on the open market. This is a challenge to our anti-submarine forces. In addition to quality platforms, weapons systems, sensors and processing power are available to countries intent on shifting the balance of regional power. Our continued investment in submarine modernization is the most prudent counter to these threats.

New Threat Environment

The warfare challenge that drives the need for submarines extends beyond the submarine threat. Missiles and mines are among the top warfighting concerns of our naval leadership as they look to the future. The value of the submarine in this hostile environment can not be overstated. The submarine role takes on greater importance as littoral nations strive to procure the warfighting equipment that could deny surface access to adjacent waters. Submarines operating in or near these waters provide the Task Force Commander with a non-obtrusive asset that prepares the battlespace and responds with force when

required. This unique warfighting asset prepares the battlespace to enable the flow of follow-on forces.

Force Levels and the Need to Restart Production NOW

The Department of Defense position is to maintain a force level of 45-55 attack submarines. The Joint Chiefs of Staff have mandated that 10-12 submarines have SEAWOLF like stealth by the year 2012.

No U.S. submarine has been authorized for construction since 1991.

This creates a challenge of maintaining the required force level in a era of rapidly declining budget resources with an unprecedented gaps in the construction of nuclear attack submarines.

We need to achieve a continuous and efficient submarine production rate by 2002 in order to sustain the required SSN force levels. Starting in 2011 our remaining 688s will reach the end of their service life at a rate of 3 to 4 per year. Given the time span to construct a submarine coupled with the fact that future build rates will be at a low rate of production -- we must begin building the new class of submarine as soon as we can -- 1998. Reaching low rate production by the turn of the century will satisfy vital military requirements and sustain our ability to build submarines - affordably.

II. NEW ATTACK SUBMARINE

Why a New Class of Submarines?

Two distinct streams of thought converged to establish the requirement for a new submarine design:

- First, the anticipated demise of the Russian Navy called into question the need for SEAWOLF class submarines. The SSN-21 was perceived to possess excess military capability in light of the projected post-Cold War security environment. The Navy revised its submarine recapitalization efforts toward developing a lower cost alternative for SEAWOLF. Simply stated, the Navy needs a submarine that can be built in adequate numbers to sustain submarine force levels well into the next century. "Surplus Capability" had to be traded for cost.

- Second, the dominant threat over the past four decades has been the Soviet Union. That threat concentrated submarine performance toward only two of

the many missions performed by SSNs. Accordingly, submarine design efforts were also dominated by Anti-Submarine warfare and Anti-Ship Warfare mission requirements. Although other missions were exercised during the Cold War, special enhancements and technology applications were not optimized in submarine designs. Today, the threat has expanded beyond the Russian Navy to a more diverse set of dangers that include theater ballistic missiles, cruise missiles, diesel submarines and mines that are now being proliferated throughout the littoral nations of the world. Realizing that SSNs will play a prominent role in this new security environment, the Navy acknowledged the need for a new submarine, specifically tailored for the changing mission and threat.

The confluence of these two streams of thought led to the development of the New Attack Submarine -- a submarine that will provide the Navy with the required military capability -- for less cost -- and fully address the multi-mission diversity required in the post-Cold War environment.

Design/Build Approach

The New Attack Submarine is using a design/build approach as the cornerstone for affordability. We have established a partnership with the Groton, CT builder much earlier in the ship design process than on previous submarine programs. This was possible because decisions taken earlier determined that the lead New Attack Submarine would be designed and built at Groton. This early partnering meant that the design could be truly optimized to the builder's method of ship construction. There was an early establishment of integrated teams from the Navy, key component suppliers, designers and shipbuilders to drive costs down by making prudent, early decisions on ship design before less efficient approaches were locked in.

New Attack Submarine -- Right for the Future

The New Attack Submarine design incorporates needed improvements on core characteristics that make submarines dominant in multiple warfare scenarios. It also reflects a dedicated effort by the Navy to preserve or enhance the submarine's performance in most mission areas.

The design is innovative by being able to insert new technologies as they develop and accommodate new equipment.

Integral to this entire process is the unprecedented demand for controlling procurement and life cycle costs.

The need for greater military capability and flexibility must be satisfied at the lowest possible cost.

New Attack Submarine -- Littoral Warfare Performance

The New Attack Submarine is the first nuclear submarine designed to focus on the spectrum of missions rather than emphasizing Cold War priorities. For operations in potentially mined and shallow waters, the new submarine will incorporate a system that reduces its magnetic signature. Its mast arrangement and torpedo room will be reconfigurable so that they can be altered to conform to specific missions. Incorporating a fiber optic "periscope", called a Photonics Mast, provides improved night vision, enhanced image recognition, improved threat recognition and a laser range finder. It will also be constructed with a Special Forces exit and entry chamber. It will be capable of carrying underwater vehicles designed to deliver Navy Seals or Marine Recon Forces.

An "open systems" commercialized electronics architecture, facilitating the use of Commercial Off the Shelf Systems, ensures that New Attack Submarine will remain in step with the electronics revolution. While remaining the "silent service", this submarine will be connected with all Naval and Joint communications networks.

Lastly, engineering developments in the propulsion plant contribute to the New Attack Submarine's total mission performance. Stealth is the enabling capability that allows the submarine:

- to maintain tactical advantage
- to enjoy unimpeded access to critical waters
- to avoid confrontation when appropriate
- to covertly observe the adversary

New Attack Submarine and Affordability

In addition to the military requirements that drove the design of the New Attack Submarine, affordability has been a major focus since the work began. Once the military requirements were established and validated, affordable production and life cycle support assumed center stage.

Major cost reductions have been realized through producibility initiatives such as simplification, the use of more commercial items and integrating the efforts of design and build teams.

This New Attack Submarine, with all its enhanced capabilities, will cost far less than producing SEAWOLF in a

similar economic and production environment. In fact, the cost will be comparable to the Los Angeles Class Submarine in today's market.

New Attack Submarine and Flexibility

Efforts have been made to ensure that the New Attack Submarine will remain the right submarine far into the next century. It has been designed for flexibility. It affordably incorporates future technologies when they become available. One of the enabling features for unprecedented capability is Modular Isolated Deck Structure (MIDS). MIDS isolates deck mounted equipment from radiating noise into the water and protects the same equipment from violent external shock. Because MIDS satisfies a large portion of the noise and shock specifications, commercial equipment including electronics can be used more than ever before. The need for MILSPEC equipment is reduced. Since more commercial components are used, this platform will be able to affordably maintain "state of the art" technology throughout its lifetime.

After twenty years of production and sixty-two ships, the Los Angeles Class Submarines have expended their room for growth, due to weight constraints. The MIDS concept will help mitigate this problem from occurring on the New Attack Submarine.

The Navy and DoD have confirmed independently that best state-of-the-art technology has been incorporated into the New Attack Submarine; there are no new technologies in sight; and when new technologies become available, New Attack Submarine will share in their use and do so in an affordable manner.

The Navy's integrated submarine recapitalization plan sustains a critical national asset ensuring that we maintain future readiness and maritime supremacy. The plan to build the SSN 23 in FY 1996, continue New Attack Submarine design efforts and start lead ship construction in FY 1998 is fully funded in the FYDP. The second New Attack Submarine (FY2000) is also fully funded in the FYDP.

III. THE REQUIREMENT FOR A BRIDGE SUBMARINE

We have made a commitment to the New Attack Submarine as the submarine for the next century, but we have a problem.

The problem is an unprecedented gap in the history of the construction of attack submarines. There have been no

new construction starts since 1991. We are clearly in a transition period from high rate to low rate production. We need a method to "bridge" this gap. There are six key elements to be considered in any bridge solution:

1. Design of complex, vendor-supplied non-nuclear components,

2. Production of complex, vendor-supplied non-nuclear components,

3. Design of nuclear components,

4. Production of nuclear components,

5. Design of nuclear submarines,

6. Construction of nuclear submarines.

The issue was examined in a number of ways, including studies by the Navy, the Joint Staff and the Office of the Secretary of Defense, as well as an independent examination of the issues by the RAND Corporation.

The conclusions drawn by all of these studies are essentially the same, i.e. additional SSN construction is essential to "bridging" submarine production from 1991 (last nuclear submarine new construction authorization) to the planned authorization of the New Attack Submarine in 1998. The gap, without SSN construction, would have a devastating impact on an industry which, of necessity, is dedicated to design and construction of nuclear submarine components and has little or no offsetting, parallel commercial work.

Construction of the SSN23 at the Groton builder was determined to be the most time- and cost-efficient solution. This decision was taken only after a thorough examination of alternatives and provides clear benefits for the Navy and the nation.

Alternatives for Bridging the Gap

1. Shutdown of the Industrial Base until 1998 or later

Nuclear capable shipbuilders represent a collection of skills that are difficult to establish but quick to perish. We have never attempted a shutdown and restart of a nuclear capable shipyard. It would be safe to say that such an exercise would be of very high risk and there is no guarantee that we would ever be able to recover the capability. Additionally, the impact of any protracted gap is felt at the component supplier level as well.

The gap may well force some of the vendor base to leave the industry. These vendors would have to be replaced before submarine production could be restarted with associated cost and schedule impacts. This would be a particularly acute problem for specialized component manufacturers.

The loss of a nuclear capable shipyard precludes the ability to rapidly ramp up production at a later date. Recertification of a shut down builder would be a long process and would require immediate restart and high SSN build rate (3-4 per year) to sustain the required force levels.

Finally, this option provides none of the key ingredients needed to permit construction of the New Attack Submarine, i.e. design and construction skills.

2. Bridging the gap with selected submarine components

This option delivers no capability for the investment made. It is a make work type of scenario that provides no support for the ship design, integration nor construction process.

3. Bridging the gap with overhaul/new construction of SSN 688I Class submarines

Overhaul of SSN 688Is

Submarine overhauls do not require the same type or magnitude of design effort associated with new submarine development. Similarly, overhauls do not require and, therefore, do not preserve the mix of skills demanded by new submarine construction. Further, overhauls provide little work for component suppliers. Without new construction, suppliers will go out of business. The talent, skills and discipline to design, build, test and integrate these components will be lost. Reconstituting would be time-consuming and costly, assuming it could be done at all. The overhaul/upgrade approach postpones inevitable block obsolescence.

Continued construction of SSN 688Is

Construction of a single SSN 688I in FY 96 may not be achievable by industry due to the short preparation time and does not provide enough workload or require the right mix of skills to maintain this critical core of personnel. It would take two SSN 688Is to provide the necessary workload to maintain baseline construction skills.

Further, as the Navy shifted to SSN 21 design and production in the late 1980s, SSN 688I suppliers began shutting down production of SSN 688I material and components and retooled to support SSN 21 production. Retooling and restarting SSN 688I

production to support one or two ships, would be expensive and inefficient, as would reinvesting in some of the older technologies which have been overtaken by SEAWOLF technologies.

Construction of SSN 23

Construction of SSN 23 provides the most cost-effective solution to sustaining the nuclear submarine design and construction capability. This approach has the near term added benefit of providing the nation with a third state-of-the-art SEAWOLF submarine.

The authorization of SSN23 takes advantage of the $900 million of SSN23 specific long lead materials previously authorized.

Authorization of SSN 23 and low rate production of New Attack Submarines, beginning with the lead ship in 1998, provides the necessary workload to maintain critical construction and design skills through this decade. Other alternatives considered simply do not possess the workload nor require the right mix of skills to adequately bridge the gap.

Why SSN 23?

The case for SSN 23 as a bridge submarine is compelling from the perspective of its value added in terms or warfighting capability, its preservation of key industrial base components and the sense it makes from an economic perspective when compared to other alternatives.

The SEAWOLF class submarine not only addresses all current warfighting needs, but introduces capabilities and technologies that are lacking in today's forces. With its superior speed and payload, the SEAWOLF is ideally suited to deliver a rapid and decisive military response. The acoustic quieting achieved in this ship will preserve U.S. dominance of the undersea battlespace that has been increasingly challenged by the advanced, high quality submarines still being built by the former Soviet Union. Acknowledging this threat, the Joint Staff has called for 10-12 submarines of SEAWOLF level quieting by 2012. In addition to quieting, SEAWOLF provides a reduced magnetic signature, making it less susceptible to mines and shallow water detection, improved electronics surveillance capabilities and the next generation sonar suite; all of which contribute to the missions assigned today and expected tomorrow. SEAWOLF can do every mission better than 688I.

Building the third SEAWOLF also represents a responsible fiscal decision. Prior to terminating the SEAWOLF class and during the subsequent period of program restructuring, approximately $380 million of SEAWOLF class components were

purchased. Additionally, $540 million directed by Congress for "SSN23 or some other project to preserve the industrial base" has been responsibly directed toward the acquisition of SSN23 components. As a result of this prudent allocation of resources, the remaining cost to build SSN-23 is about $1.5 billion. This is approximately two-thirds of the total cost, and comparable to the cost of building a new 688I.

Thus the decision to complete the SSN-23 represents an exceptional one-time financial opportunity to buy a warship second to none at about the same cost required to build a new 688I. Further, the "to go cost" of $1.5B also preserves a vital national resource and maintains market stability serving as a cost control mechanism for future production.

SSN23 construction not only makes sense from a military value and cost standpoint but has also been proven through repeated, independent, studies to be the most cost effective method for retaining the skills required to build quality submarines.

Among the alternatives considered, SSN-23 has been identified as the only feasible bridge to the 1998 start of the New Attack Submarine. The submarine industrial base is comprised of three major skill and labor elements: those involved with shipbuilding, the non-nuclear submarine unique vendors and the nuclear vendors. While New Attack Submarine development/advanced procurement will support critical design and nuclear production skills, the SSN-23 is the only project available between now and 1998 that preserves the production skills of the shipbuilder and non-nuclear submarine unique vendors. All other options considered include too much risk in maintaining or rebuilding these unique skills and facilities. The production activity over the next decade has been stretched to the breaking point. Any further disruption or alteration of the planned build profile could irreparably jeopardize industry's ability to deliver needed submarines in the future. It is imperative that we build SSN-23 in 1996.

In summary, the decision to build SSN-23 is prudent because it provides unequaled military capability through its superior stealth, speed and payload, it takes advantage of funds already appropriated procuring the ship at a cost comparable with an 688I class today, and it preserves the nation's ability to build "high tech" submarines -- providing stability during industry restructuring and transition to stable low rate production.

Cost Impact of Not Building SSN 23

The remaining investment to deliver SSN 23 is $1.5B. Completing the SSN 23 is part of the overall Navy plan to bridge

to the New Attack Submarine at the Groton, CT shipyard with lead ship construction commencing in 1998.

Detouring from completing SSN23 would cost the Government roughly $700M to $1.0B plus potential intangible costs that could be hundreds of millions of dollars. These cost are increased costs to the current SEAWOLF and TRIDENT programs as well as the New Attack Submarine program. They are all unbudgeted costs.

The rough estimate of Government liability in each area (in then year $) is:

Existing contracts	$205M - $360M
New Attack Submarine	$510M - $670M
Potential Other costs	Unknown (potentially 100s of $millions)

o **Existing Contracts**. Because there have been no submarine starts since 1991, shipbuilder workload is dramatically declining. Without SSN 23, overhead/indirect cost allocations would increase for the shipbuilder's remaining contracts. Specifically:

-- The overhead rates, estimates at completion and budgets relating to all the shipbuilder's existing contracts presume SSN 23 will absorb a substantial share of the shipbuilder's overhead.. Deletion of SSN 23 would cause overhead, to be allocated (via higher overhead rates) among remaining contracts. Moreover, additional indirect costs such as construction facility/equipment lay-up costs and unallocated material cost would be charged to existing contracts.

-- Higher overhead rates also would result in increased costs to Navy on its engineering and design contracts, which are cost type contracts for which Navy pays all allowable and allocable costs. These contracts represent about half the work to be performed by the shipbuilder for the rest of the decade.

o **New Attack Submarine**. Deletion of SSN 23 would cause overhead, which otherwise would be borne by SSN 23 in FY98 to FY02, to be allocated to the New Attack Submarine (via a higher overhead rate). More importantly, without SSN 23 in FY 96, the Navy would lose -- and then try to reconstitute -- critical capabilities essential to constructing the New Attack Submarine in FY 1998, e.g., skilled tradesmen, unique construction facilities, and key submarine component suppliers. The New Attack Submarine would bear the cost of restarting or sustaining these capabilities.

Tomorrow's Readiness- Production Activity Snapshot

During the 1980s the Navy was authorized to build thirty-eight submarines. So far, in the 1990s the number is four. As the number of submarines under construction declined from twenty-four in 1991 to two in 1996, the submarine industrial base embarked on a tremendous restructuring program.

Steady production of one to two submarines per year represents the most efficient production rate for this restructured industry. This rate safeguards the Navy's future capability to build quality submarines and provides the necessary force structure as 688 class ships reach their end of service life. The earliest start for the new SSN is 1998, with stable production achieved shortly thereafter. Industry needs a bridge to 1998. Numerous studies conducted by the Joint Staff, OD, Navy and other independent agencies show that constructing a third SEAWOLF is the most economical and lowest risk option for bridging this gap.

Certain components are unique to submarines making the submarine force the only market for them. Manufacturing these components requires an extremely skilled work force and expensive facilities. All are costly to maintain. Private industry may not support retaining this capacity unless there is a promise of continued opportunities. Committing to a low rate of production is essential toward gaining the necessary support among the unique vendors and builders of submarines.

The Need for Two Nuclear Capable Shipbuilders

The Bottom Up Review arrived at the national policy decision to maintain two nuclear capable shipyards. Two nuclear capable shipyards is a fundamental response to the uncertain Russian threat in that it provides the decision maker the ability to ramp up submarine production if and when required.

Two nuclear capable shipbuilders also provide the following benefits:

- Provides greater stability to the nuclear shipbuilding industry in terms of a business base,

- Allows for the introduction of competition at a future date if it is advantageous to the government. The fact that competition is retained as a future possibility creates appropriate pressures to contain current costs.

- Crisis protection in the event of a natural disaster.

Any potential downsizing to a single yard must also be evaluated in terms of the capabilities we lose. Those include:

- o TRIDENT/SEAWOLF design, engineering, production and fleet support expertise,

- o Nuclear power plant design capabilities

The Impact of Competition

The Navy's current plan -- SSN 23 in FY96 and continuation of the New Attack Submarine Design/Build process at Groton, CT -- preserves two nuclear capable shipbuilders and permits competition to be introduced when it is advantageous to the government.

Simply put, potential competition in the New Attack Submarine program is an issue of timing. In order to adequately sustain competition there must be a sufficiently high build rate of at least 2 submarines per year. The New Attack Submarine program does not achieve this level of build rate until FY2002 and beyond. There is also the question of when we will build the next carrier.

Introducing competition now is not in the best interest of the government based on the following:

- o It would reduce the benefits of the design/build approach.

- o Near term construction activity is insufficient to sustain two production yards

- o It would force a downsizing to a single nuclear capable shipbuilder if Groton, CT were to lose the competition,

- o It would require both yards to participate in the current New Attack Submarine design process with undesirable results including: increased design costs, no benefit form SEAWOLF lessons learned, i.e. forces split design production effort, breaks down existing partnerships with suppliers and limits benefits from the current design/build process.

- o It would extend the construction period of the New Attack Submarine lead ship.

Introducing competition in the future may be more advantageous because:

- o It allows completion of New Attack Submarine design and supports an orderly transition to stable low rate production,

o It avoids inefficiencies during the tenuous transition period

o CVN production and Nimitz class carrier refueling adequately sustains Newport News in the interim period.

A competitive scenario before stable production rates are achieved adds an estimated $650 million to $1.1 billion to cost and extends the lead ship construction period, does not support force level requirements and, in fact, we may still wind up with two nuclear capable shipyards at higher costs.

Conclusions

In summary, Attack Submarines will continue to be vital to the nation's security. The SSN's multi-mission versatility and stealth will strengthen its role in the next century. Its ability to rapidly respond to crisis situations, remain on station almost indefinitely, and provide a variety of response options are irreplaceable and increasingly important in the new security environment.

SSN-23 provides the nation with unequaled military capability and sustains the industrial base.

Our future New Attack Submarine provides the best balance between cost and capability.

Strong commitment to stable low rate production is key to preserving our nation's ability to produce advanced nuclear submarines. We must protect this crucial national asset that has been decades in the making, and allow the SSNs we build to be both capable and affordable.

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August 9, 1994

CRS Report for Congress

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Navy New Attack Submarine (NSSN) Program: Is It Affordable?

Ronald O'Rourke
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SUMMARY

The Navy plans to procure its first New Attack Submarine (NSSN)[1] in FY1998, with advanced procurement funding in FY1996. This report focuses on the potential affordability of the NSSN program. It updates a previous CRS report on this issue[2] and is intended primarily for readers already familiar with the program.[3] A key measure of the affordability of the NSSN program is the share of the Navy's shipbuilding budget that would be required for NSSN procurement. This share will depend on the size of the shipbuilding budget, the NSSN procurement rate, and the NSSN's unit procurement cost.

INTRODUCTION: AFFORDABILITY AND SHARE OF SCN

Affordability is a primary goal of the NSSN program. The NSSN is to be less expensive -- that is, more affordable -- than the Seawolf (SSN-21) submarine design. Being *more* affordable than the Seawolf, however, does not necessarily make the NSSN *sufficiently* affordable. A key measure for judging whether a Navy shipbuilding program is sufficiently affordable is the share of the Navy's shipbuilding budget (known as the Shipbuilding and Conversion, Navy, or SCN, appropriation account) that would be required to procure the ship at the Navy's desired rate.

This measure was used by the Navy in the mid-1980s to argue the affordability of the Seawolf program. The Navy stated that procuring the Seawolf design at the then-desired rate of about 3.3 boats per year would not require significantly more than 20 percent of the SCN account -- the average share of SCN accounted for by attack submarine (SSN) procurement during the Cold War. When subsequent lack of real growth in SCN and increases in the

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[1] The NSSN was previously known as the NAS or the Centurion submarine.

[2] CRS Report 93-10F, *Navy Centurion Attack Submarine: What is Affordable?*, by Ronald O'Rourke. 6 p. (Jan. 6, 1993 [some copies mistakenly dated as Jan. 6, 1992])

[3] Readers not familiar with the NSSN program are encouraged to read CRS Issue Brief 91098, *Navy Attack Submarine Programs: Issues for Congress*, by Ronald O'Rourke.

unit procurement cost of the Seawolf pushed the program well beyond this 20 percent mark, it became a significant factor in congressional support for terminating the Seawolf program.

The share-of-SCN approach to judging the affordability of a ship procurement program reflects the need for the Navy to reconcile its limited resources with its requirements for various types of ships -- aircraft carriers, surface combatants, submarines, amphibious ships, mine warfare ships, and support ships. The share-of-SCN approach in effect says that a ship design is affordable if procuring it at the desired rate does not preclude the Navy from procuring sufficient numbers of the other kinds of ships that it needs. This report examines four key questions relating to the share-of SCN approach, and concludes with a discussion of Figure 1, which shows how the share of SCN required for NSSN procurement varies as a function of the size of the SCN account and the NSSN procurement rate.

POST-COLD WAR SHARE OF SCN

What share of SCN should be allocated to procurement of SSNs in the post-Cold War era?

The average of 20 percent of the SCN account going to SSN procurement is a Cold War figure. Whether SSN procurement in the post-Cold War era should account for about 20 percent of SCN, or some lower or higher figure, is not clear.

During the 1980s, when the Navy considered it appropriate for SSN procurement to receive not significantly more than 20 percent of SCN, the Navy was planning on a fleet of about 600 ships, of which 100, or 16.7 percent, were to be SSNs. The Navy now plans to maintain a fleet of 330 ships, of which 45 to 55 SSNs, or 13.6 to 16.7 percent, are to be SSNs. The 330-ship plan, moreover, appears to have proportionately as many higher-cost combatant ships of all types as the 600-ship plan. This might suggest that in the post-Cold War era, the appropriate SSN share of SCN should be no higher than, or perhaps somewhat lower than, it was during the Cold War.

Technological developments in recent years, however, may have altered the costs or capabilities of some kinds of ships, increasing the relative cost-effectiveness of some types while reducing that of others. Consequently, while the percentage of 330-ship fleet accounted for by SSNs might suggest a certain share of SCN for SSN procurement, shifts over time in the intrinsic costs and capabilities of various ship types might suggest a different and perhaps higher share.

Under current Navy long-range plans for maintaining a 330-ship fleet, the SSN share of SCN would be somewhat higher than it was during the Cold War. In testifying earlier this year on its recapitalization plan -- its plan for restructuring its budget accounts so as to make more money available by the turn of the century for procurement of ships and aircraft -- the Navy stated that

it intends to increase the SCN account from the current FY1995-FY1999 average of $7.19 billion in FY1998 dollars to $9.44 billion in FY1998 dollars by the turn of the century -- a real (inflation-adjusted) increase of about 31 percent.[4] It also stated that of this $9.44 billion SCN account, $2.47 billion, or about 26 percent, is to be allocated for procurement of 1.5 NSSNs per year.[5]

SIZE OF SCN ACCOUNT

How large will the SCN account be at the turn of the century?

The Navy intends to achieve a 31-percent real increase in the SCN account by the turn of the century even though its expects the Navy's overall budget to decline about 10 percent in real terms between FY1995 and FY1999.[6] The Navy plans to accomplish this by rapidly reducing to the planned 330-ship fleet size and by aggressively reducing its fixed overhead costs. The latter objective is to be attained in large part by closing numerous bases and depots.

In hearings earlier this year on Navy programs, some Members of the defense oversight committees have questioned whether the Navy will be able to increase its procurement accounts by the turn of the century as much as planned. They questioned, for example, whether savings from base closures will be as large as the Navy expects, particularly in the shorter run. The Navy acknowledges that there are risks to its plan for increasing its procurement accounts: changing world conditions may require retaining a fleet of more than 330 ships; the costs of closing bases may be underestimated; demands on the Navy may lead to increased operational costs; and attempts to realign maintenance activities may not work.

REQUIRED PROCUREMENT RATE

What is the required procurement rate of the NSSN?

The required long-term average procurement rate for a given kind of ship is equal to the planned force size for that kind of ship divided by the expected service life of that kind of ship. SSNs currently have an expected service life of 30 years. Thus, the required long-term average procurement rate for maintaining a force of 45 to 55 SSNs is 45 to 55 divided by 30, or an average of 1.5 to 1.83 boats per year over a period of 30 years.

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[4] Unless otherwise stated, all dollar figures in this report are constant FY1998 dollars.

[5] Briefing slide entitled "Average SCN Yearly Breakdown," in package of slides accompanying Opening Statement of VADM T. Joseph Lopez, Deputy Chief of Naval Operations (Resources, Warfare Requirements & Assessments), Testimony to the Acquisition Subcommittee of the House Armed Services Committee, 13 April 1994. This slide expressed figures in FY1994 dollars. The figures were inflated to FY1998 dollars using the Jan. 24, 1994, Department of Defense budget authority deflators for procurement excluding pay and fuel.

[6] Briefing slide entitled "Navy TOA & Ship Procurement," in package of slides accompanying Opening Statement of VADM T. Joseph Lopez, op cit.

Current procurement plans, however, will result in the procurement of only 4 SSNs during the decade of FY1990-FY1999. Unless the service lives of submarines funded in the 1980s can be extended several years past the current 30-year mark, avoiding a drop in the SSN force below the planned level of 45 to 55 during the 2020s will require procurement of 41 to 51 SSNs in the 20-year period FY2000-FY2019. This equates to a rate of 2.05 to 2.55 boats per year. Current Navy plans call for procuring 2 NSSNs per year starting in FY2003.[7]

UNIT PROCUREMENT COST

How accurate is the Navy's estimate of the NSSN's unit procurement cost?

The Navy estimates the unit procurement cost of the NSSN design at $1.5 billion. One way of assessing the probable accuracy of this estimate is to compare it to the Navy's estimated unit procurement costs for the Improved Los Angeles (I688) class SSN design and the Seawolf design -- $1.4 billion and $2.1 billion, respectively -- since the I688 and Seawolf estimates reflect data on actual I688 and Seawolf construction costs.

Submarines of roughly the same level of complexity, technological sophistication, and quality should have roughly the same cost per unit weight. The estimated cost per unit weight of the Navy's 7,500-ton NSSN design ($200 million per thousand tons of displacement) is virtually the same as that of the 6,950-ton I688 design (about $201 million per thousand tons). It is about 13 percent less than that of the 9,150-ton Seawolf design (about $230 million per thousand tons), but the NSSN design contains many cost-reducing features not present in the Seawolf design.

Another way of judging the accuracy of the Navy's estimate is to examine past case studies. In testifying earlier this year at a hearing on the Navy modernization programs,[8] the General Accounting Office noted an August 1992 GAO study[9] that reported a 24-percent increase in the cost to complete 165 ships under construction. GAO further noted a 1993 RAND Corporation study of almost 200 U.S. weapon systems, including many Navy systems, that found an average of about 20-percent real cost growth over a 30-year period.[10] If the

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[7] U.S. Navy briefing slide package, *N87 Talking Points for meeting with Ron O'Rourke*, Aug. 4, 1994, p. 14.

[8] Statement of Richard A. Davis, Director, National Security Analysis, National Security and International Affairs Division, before the Subcommittee on Military Acquisition, Committee on Armed Services, House of Representatives, April 26, 1994. p. 3.

[9] U.S. General Accounting Office. Navy Contracting: Cost Growth Continues on Ship Construction Contracts. Washington, 1992. 32 p. (GAO/NSIAD-92-218, August 1992)

[10] Drezner, J. A., et al. An Analysis of Weapon System Cost Growth. Santa Monica, CA, RAND Corp., 1993. 84 p. (MR-291-AF)

NSSN unit procurement cost exceeds the Navy's estimate by 20 percent, this would increase its unit procurement cost to $1.8 billion.

The RAND report, however, noted that the average cost growth for Navy systems was 16 rather than 20 percent. It also noted that ships "appear to incur significantly less cost growth on average [about 10 percent] than other system types, perhaps because of technical differences that make ships less uncertain to estimate, a relatively sophisticated Navy cost analysis capability, or the absence of ship combat systems from ship system [Selected Acquisition Reports]."[11]

CONCLUSION

Figure 1 shows the NSSN program's share of SCN as a function of the size of the SCN account and the NSSN procurement rate. The NSSN's unit procurement cost is assumed to be $1.5 billion; if it turns out to be higher or lower, then the three sloping lines on the graph will shift up or down, respectively (i.e., for any given SCN size and procurement rate, the share of SCN required for NSSN procurement would be higher or lower, respectively). The following concluding observations can be drawn from the figure:

- If the NSSN procurement rate is 1.5 boats per year, the Navy is successful in its plan to increase SCN to $9.44 billion by the turn of the century, and the NSSN's unit procurement cost is $1.5 billion, then NSSN procurement will require 24 percent of SCN -- a share not much higher than Cold War average of 20 percent, and slightly less than the 26-percent allocation mentioned in the Navy's testimony earlier this year;

- If the NSSN procurement rate is 2 boats per year, then NSSN procurement will require more than 30 percent of SCN, even if SCN is $9.44 billion and the NSSN's unit procurement cost is $1.5 billion. This is somewhat higher than the 26-percent allocation mentioned in the Navy's testimony, and significantly higher than the Cold War average of 20 percent;

- If SCN falls short of $9.44 billion or the NSSN's unit procurement cost exceeds $1.5 billion, or both, then for a procurement rate of 1.5 boats per year, the share of SCN required for NSSN procurement could approach or exceed 30 percent. For a procurement rate of 2 boats per year, it could approach or exceed 40 percent.

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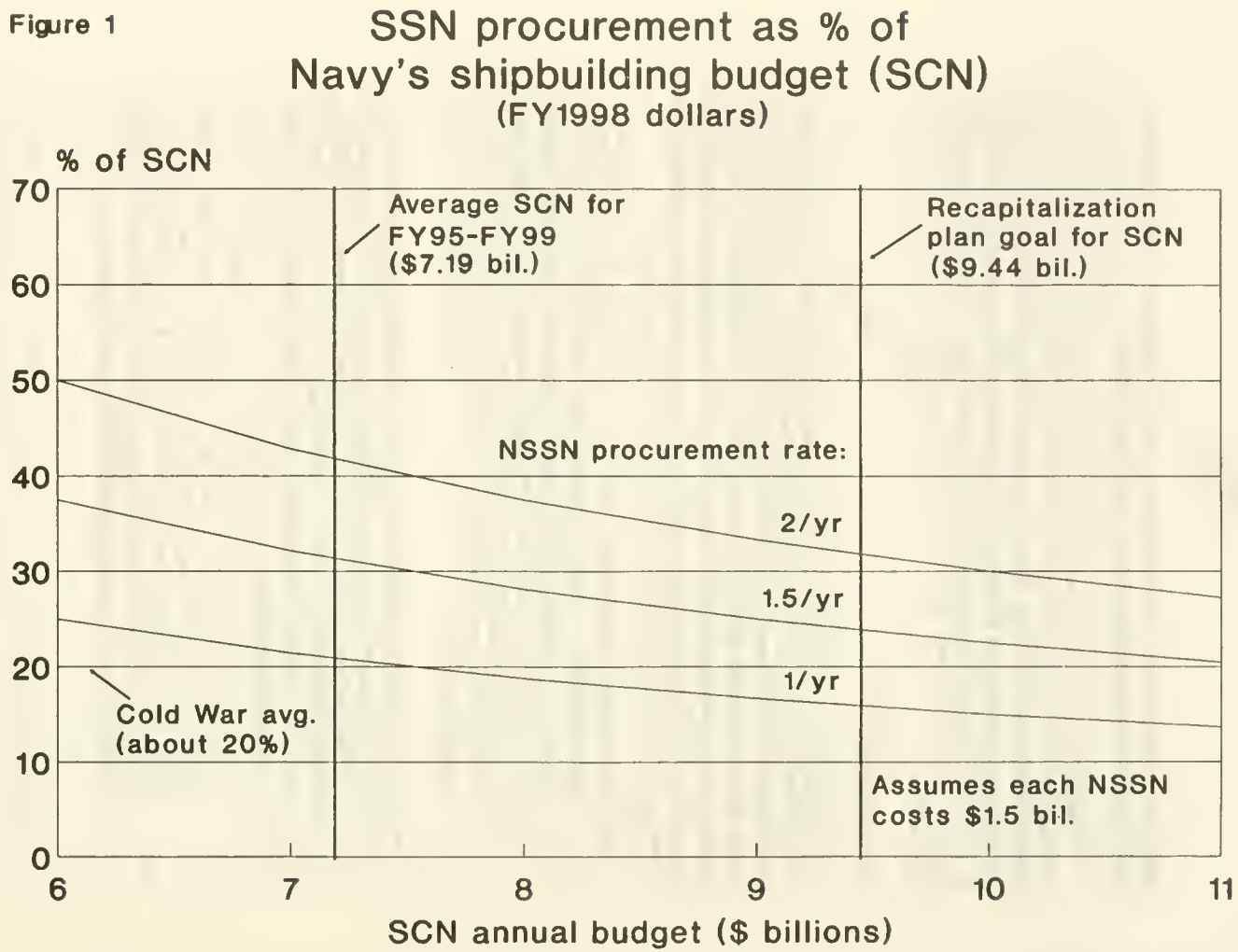
[11] Ibid., p. xiii, 26-28.

Figure 1



Prepared by CRS, 6/94, based on U.S. Navy data. See text for discussion.

Mr. HUNTER. Thank you, Secretary Slatkin.

If the members agree, I think that we have got a vote on here. I think it is important that everybody listens to all of the testimony so why don't we suspend for about 10 minutes, go get the vote and we will be back in 1 minute.

[Recess.]

Mr. HUNTER. Thank you for your remarks and your statement.

What I would like to do is to be able to let the next panel speak and then have everybody available for questions.

Admiral Demars, let me ask you one thing though. I think we need to clear the air on one issue before you leave the witness table. We thought it was important to have the members of the defense in the civilian industrial base here, primarily representatives from both of the shipbuilders, to be able to have a full discussion and a full forum on this issue.

Let me tell you frankly that we have talked about this. You apparently talked to one of the shipbuilders, the Newport News folks, and had a discussion with them. Let me just say, from my perspective, it was then very difficult to get them to this hearing after you talked to them.

I just want to ask you and let you, for the record, clear the air with respect to your commentary to them. One of my responsibilities is to make sure that everybody attends, that we get all of the information we can on the record. Just the notion that someone in uniform would in any way deter one of my civilian witnesses from coming up and being able to speak very frankly and very candidly was very concerning to us. This is your opportunity to dispel that situation. I thought we would give you that chance.

Mr. DEMARS. Thank you, Mr. Chairman for that opportunity.

First of all, I have been in this business long enough not to do anything as dumb as that. Second, it was an issue, but it was with Tenneco. It had nothing to do with Newport News. It was a related issue to this. I had a spirited discussion with the CEO at Tenneco. It had nothing to do with the attendance at this hearing. I would never do anything like that.

Mr. HUNTER. Did it have anything to do with the subject matter of the hearing?

Mr. DEMARS. Oh, yes, sir. Yes, sir, but a completely separate issue.

Mr. HUNTER. Did you in any way give them parameters within which they could or could not testify or tell them that they were constrained?

Mr. DEMARS. Absolutely not. I have been working these kinds of issues in Washington for about 14 years and I have never done that.

Mr. HUNTER. OK.

Mr. DEMARS. I would never intend to do it.

Mr. HUNTER. OK. Thank you, Admiral Demars.

We appreciate that statement.

If the next panel would come forth.

Secretary Slatkin, Admiral Demars, Admiral Jones if you could remain ready for questions; we are going to be batting this ball around a little bit here. We are in the information mode today.

If Mr. Fricks, Mr. Turner, Mr. Davis of General Accounting Office [GAO] and Mr. O'Rourke of Congressional Research Service [CRS] could come forward, we would appreciate you.

The Secretary has basically set the stage by advocating the administration's position. Mr. O'Rourke and the other gentlemen have had a chance to listen to that. Mr. O'Rourke, you have extensively analyzed this issue. I know that by spending some long hours reading your reports. You are very eloquent on the issue.

This is your opportunity to comment on the decision that has been made by the administration, alternatives that you see out there and any issues you think this committee should further explore. The floor is yours.

STATEMENT OF RONALD O'ROURKE, SPECIALIST IN NATIONAL DEFENSE, CONGRESSIONAL RESEARCH SERVICE

Mr. O'ROURKE. Thank you, Mr. Chairman for the opportunity to appear today to discuss the issues that you just mentioned. With your permission, I would like to submit that full statement for the record and then proceed to give a summary presentation based on some enlargements to the side over here.

Mr. Chairman, for the past 19 months two separate and somewhat divergent statements of the attack submarine force level requirements have been competing for the attention of policymakers. One of these is the Bottom-Up Review statement which calls for maintaining a force of 45 to 55 attack submarines.

The other is a JCS study which calls for maintaining a force of 51 to 67 attack submarines, including 10 to 12 with *Seawolf* level stealth. The continued existence of these two separate and somewhat divergent statements of the attack submarine force level requirements is a source of ambiguity and possibly some confusion in attack submarine procurement planning.

Also, it is important to know that the Joint Chiefs of Staff (JCS) requirement for 10 to 12 *Seawolf*-level quiet boats is a requirement that is to be met by 2012 and not 2010 as some recent Navy statements have indicated.

The difference between 2012 and 2010 is critical because funding the third *Seawolf* submarine in fiscal 1996 would not be necessary to meet that goal by 2012, but it would be necessary to meet it by 2010.

In talking about the general topic of requirements for attack submarines, there are two points that can be made up-front. The first, which was mentioned earlier, is that attack submarines are something that the United States get not just to counter other people's submarines, but to perform a variety of missions.

Second, in the current post-cold-war context, the discussion over requirements for attack submarines takes into account both non-Russian and Russian considerations. Requirements for overall numbers of attack submarines and for building attack submarines that have features for littoral operations is driven mostly by non-Russian considerations of fighting regional conflicts, maintaining regional presence.

The requirement to build submarines with *Seawolf*-level stealth, on the other hand, is driven primarily by the need to counter the

newest generation of Russian submarines that you heard about earlier.

In talking about the issue of overall numbers of attack submarines, one very important point to bear in mind as we go into the topic is that the 1990's will be a decade long near hiatus in attack submarine procurement.

If the administration's plans are carried out, we will fund only four attack submarines during that entire decade. That works out to a rate of 0.4 attack submarines per year for a 10-year period; a near hiatus of considerable length.

This near hiatus in the attack submarine procurement rate will have important effects on downstream requirements for the procurement of attack submarines. That situation is illustrated on the graph that appears on the next chart.

This graph appears in my written statement on page 12. This shows the number of attack submarines in our force under certain scenarios out to the year 2035. As you can see in the chart, the challenge in maintaining overall numbers is not in the short run because we have plenty of submarines in the short run, nor is it in the medium run because we still have a fair number even out to this date.

The challenge rather is in the long run, particularly after the year 2020. That is the period in which the submarines that we will have will be primarily those funded from the 1990's onward. It is the period during which the effect of not having procured many submarines during the 1990's will make itself felt.

If you will look at the top line right here, this depicts the number of submarines in our force if we eventually reach a procurement rate of two boats per year. Under normal conditions, a 2-per-year rate would be enough to maintain a force of 60 attack submarines.

Because we did not get very many during the 1990's that rate in fact will produce a force that drops to a low of about 41 boats in the mid-2020's.

The situation that I just showed you there on that graph is summarized in tabular form on this next chart. These are the various force levels that people have been discussing. Let's choose 45 as the one to use as an example.

Under normal conditions that would imply a steady state procurement rate of 1½ boats per year. If we wanted to maintain 45 boats through the long run, through the 2020's, the fact that we didn't get very many during the 1990's will now mean that we will have to sustain a procurement rate of slightly more than two boats per year.

Furthermore, if we choose to extend the hiatus in attack submarine procurement out to the year fiscal 2002, that would only make the downstream procurement higher. It would increase it to 2.4 boats per year.

This table presents a situation of a bywave. We have already created the requirement for a downstream procurement bywave because of the 1990's near hiatus in attack submarine procurement. We would only make that problem more difficult if we extend that hiatus out past the turn of the century.

I want to now turn to one of the two specific program issues that we will be talking about this afternoon; the first one being the re-

quest for funding for the third *Seawolf* attack submarine in fiscal year 1996, the SSN–23. One thing to note is that funding the third *Seawolf*, SSN–23, is not necessary in fiscal year 1996 to meet the JCS requirement of having 10 to 12 *Seawolf*-level quiet boats by the year 2012.

We have already funded two such boats, the first two *Seawolf* submarines, and that means we need another 8 to 10 more in service by 2012. That means you need another 8 to 10 to be funded by fiscal year 2006. Under current plans we can fund another 9 to 11 new attack submarines by that time. Those 9 to 11 boats, plus the first two *Seawolfs* can meet the JCS goal by the year 2012.

The principal issue regarding the procurement of the third *Seawolf* submarine in fiscal year 1996 rather is the industrial base issue. This is the question of whether the United States in the future should have an industrial arrangement for the production of nuclear powered warships that involves two yards or one.

The two yard strategy or the split arrangement is the arrangement that has been chosen by the administration as its preferred alternative. Under that arrangement Electric Boat would build submarines and Newport News would build carriers.

The main arguments in favor of that option are first that it preserves the ability to bring a second submarine yard back into production, namely at Newport News, to sustain a combined production rate between the two yards of more than three boats per year. The two yards right now are basically limited to three boats each.

The second argument in favor of that strategy is that it provides some hedging against the risk that an accident or some other unforeseen event will close down production at one of these yards. You would still have another yard open capable of producing nuclear powered warships.

I should mention that the need to build more than three per year could arise in part because of the bywave effect that I discussed earlier in combination with the need to ballistic missile submarines at some point down the road past the turn of the century.

The main implication for fiscal 1996 funding of the two yard or split arrangement is that some kind of submarine construction work would probably have to be funded for Electric Boat to bridge it out to the advent of the New Attack Submarine Program in fiscal year 1998.

The alternative arrangement for nuclear warship construction is the one yard or consolidated arrangement under which production of both submarines and carriers would be consolidated at Newport News. The primary arguments in favor of that arrangement are also twofold.

First, that you could have economies of scope in the production of nuclear powered warships principally because those warships, those submarines and those carriers would bear the fixed cost of only one nuclear certified yard rather than two. A second argument is that although the production rate at Newport News is currently limited to about three boats per year, it could in fact be expanded to four or more boats per year.

For example, Newport News has told me that with the procurement of a $5 million crane their current submarine construction fa-

cility could have its production throughput capacity increased from three boats per year to four.

The principal funding implication of going with a consolidated option is that it would permit the option of not having to fund any attack submarines in fiscal year 1996. That is because Newport News has testified in the past that if two conditions are met, they would be able to bridge themselves out to the advent of the New Attack Submarine Program without having to have any interim submarine construction work.

Those two conditions are that they build CVN–76 and that is a condition that has now been met, and that they receive some submarine overhaul and repair work that would normally go to the naval shipyards.

If the two yard or split arrangement is chosen, then there are at least four potential options for providing submarine construction work to Electric Boat. One of those options is to build the 23 itself. That is the administration's option.

A second would be to build a portion of the SSN–23, presumably the back end, into which the already ordered nuclear propulsion plant for that boat would go. This is not building components of submarines like valves and pumps which would then sit on shelves. This rather is building a major portion of the submarine.

A third option would be to build to outfitted hull cylinder sections.

Mr. HUNTER. Would that be done with the presumption that you are going to be completing this or utilizing it for training or what?

Mr. O'ROURKE. You could look at it either in two ways. You could look at it as a partial construction project that might be able to be finished down the road, although the feasibility of doing that, I think, would be somewhat questionable and could run into great cost difficulties.

Or you could build it just to sit there. You might use it as a land base test or training facility, although the Navy has not expressed a need for having any such facility.

The third option on the list would be to build outfitted hull sections for existing *Los Angeles* class attack submarines. You would then bring these existing submarines into the shipyard, cut them in two, put these hull sections in and create new lengthened versions of these attack boats that had special expanded capabilities in certain areas, such as cruise missiles, mines or special operations forces embarkation.

The fourth option would be to build one or two additional improved 688 class submarines. All of these options involve some amount of construction and integration work, though, to varying degrees. None of these options would provide significant amounts of design work.

The design portion of the submarine construction industrial base at this point is being maintained by the New Attack Submarine Program. Of the four options here, only the first would provide a *Seawolf*-level stealth boat. Although as mentioned earlier, it is not necessary to do so with the JSC goal.

Of these options, the two middle ones might be less expensive than the first, but the feasibility and the overall cost effectiveness

of these two options relative to the first is not well understood because it has not been fully discussed in public.

I want to turn now to the other principal issue that we will be facing this year. That is the question of whether to continue funding for the New Attack Submarine Program. The table at the top of this chart depicts the administration's view on why the new attack submarine is preferable to the two existing designs that are available.

I want to focus on one of the criteria that is on this table. That is the criteria of affordability. In August of last year, CRS published a report which I authored that focused on the affordability issue and looked in particular at one key measure of affordability which is the share of the shipbuilding budget that would be required to build this boat in the numbers that the Navy is talking about at one and a half or two boats per year.

In the past, during the cold war, attack submarine construction consumed an average of about 20 percent of the shipbuilding budget. The CRS report concluded the following: that a rate of 1½ boats per year would be affordable without going much above this 20-percent figure, if two conditions are met.

First, that the Navy is successful in its intent under its recapitalization plan to increase the size of the shipbuilding budget by the turn of the century from its current figure to a figure of more than $9 billion in fiscal year 1998 dollars.

Second, if the cost of the follow-on boats in the new attack submarine class meets the promised goal of $1.5 billion per boat, again in fiscal year 1998 dollars.

A rate of two per year could be afforded if these first two conditions are met and if an additional third condition is met that you simply reach an agreement to increase the share of the budget that goes to attack submarine procurement to above 30 percent.

I want to conclude my presentation by making some comments about the idea of competing production of the new attack submarine. This has come up recently in discussions on Capitol Hill.

In response to inquiries of some Members of Congress, Navy officials in recent weeks have stated that they do not believe it would be a good idea to compete production and to dual source production of this submarine in the earliest years of the program because the production rate for the program is just too low in the earliest years.

That it might be a good idea to do so downstream when the production rate reaches two boats per year. The idea of competing and dual sourcing production of this boat when it reaches two boats per year is open to question on several grounds.

First, it is not clear because of the affordability considerations that I mentioned earlier that we will in fact be able to reach a rate of two per year. The achieved rate may be closer to one and a half per year.

Second, even if we can reach a rate of two boats per year, it is not clear that the government will be able to hold a meaningful competition between two yards at that rate.

The government in effect announced last year that for fiscal 1994 and 1995 it could not maintain any meaningful competition between two surface combatant builders at a rate of three ships per year. So how can you maintain such a rate at two per year?

Third, even if the government can somehow maintain a nominal competition and dual source this program at two boats per year, the result of splitting production of such a low-rate program between two yards might actually be to increase total shipyard production costs rather than decrease them.

That is due principally due to the effects of splitting the learning curve between these two yards. Rather than possibly competing and dual sourcing the program downstream if and when it gets to two boats per year, the alternative, if you are interested in applying competition to the program in some way, would be to apply it up-front and have it be a winner take all competition for production of all boats in the class.

That has the potential for generating significant leverage for the government. It would also avoid the potential cost increases associated with splitting the learning curve between two yards.

If you are to have an up-front winner take all competition, then the key policy question of whether to have a split nuclear arrangement or a consolidated nuclear warship arrangement would not be decided by deliberate policy choice. Instead, it would simply be decided as a matter of who won that competition.

Last, if there is to be an up-front competition of a winner take all nature, then steps would probably have to be taken to ensure that there was a level playing field for such an important competition. Those steps could include for example, funding SSN–23 or some other kind of attack submarine work to make sure that Electric Boat was a healthy competitor in fiscal year 1998.

It would also mean ensuring possibly that Newport News was a full observer and consultant, if not a direct participant, in the new attack submarine design process so that Newport News would have an understanding of the design of that boat that was equal to Electric Boat's.

Third, if features are now being incorporated into the design of new attack submarine so as to optimize that design for the particular production processes and methods at Electric Boat, those features would have to be removed form the design so the design would not have a built-in cost advantage for Electric Boat.

Mr. Chairman, that concludes my presentation. I will be happy to respond to any questions you might have.

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HOUSE NATIONAL SECURITY COMMITTEE

STATEMENT OF

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BEFORE THE

HOUSE NATIONAL SECURITY COMMITTEE

SUBCOMMITTEE ON MILITARY PROCUREMENT

HEARING ON

SUBMARINE ACQUISITION ISSUES

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Mr. Chairman, distinguished members of the subcommittee, thank you for the opportunity to appear before you to discuss issues relating to the Administration's proposed plans for submarine acquisition.

As requested, the first section of my testimony addresses the general issue of future requirements and building rates for attack submarines. The following two sections discuss the two specific submarine-acquisition issues facing Congress this year:

- First, what should be the near-term, stop-gap measure for maintaining (i.e., "bridging") the submarine construction industrial base until the start of a follow-on submarine acquisition program? This is the issue of whether to fund SSN-23, a third Seawolf (SSN-21) class submarine, at a cost of about $1.5 billion in FY1996 budget authority.

- Second, what should be the follow-on program that starts at the other end of the "bridge"? This is the issue of whether to approve about $1.16 billion in FY1996 funding to continue work on the New Attack Submarine (NSSN) program. The Administration plans to procure the first NSSN in FY1998, but the FY1996 budget request for the NSSN program includes about $705 in advanced procurement funding for the first boat.

Congress' decisions on these two issues will affect the future configuration of the submarine construction industrial base and the future of the U.S. attack submarine fleet.

SSN FORCE-LEVEL REQUIREMENT AND PROCUREMENT RATE

Two Competing Requirement Statements -- BUR and JCS

Since September 1993, two separate and somewhat divergent statements of the SSN force-level requirement have been allowed to exist and compete for the attention of policymakers. One is a Joint Chiefs of Staff (JCS) requirement first done in 1992 and updated in mid-1993. It calls for a force of 51 to 67 SSNs, including 10 to 12 boats with Seawolf-level stealth by the year 2012. The other is the September 1993 Bottom-Up Review (BUR) force-level goal of 45 to 55 SSNs.

In theory, the BUR force-level goal of 45 to 55 SSNs should be the controlling number -- it came out after the JCS study, and it represented the official position of the Department of Defense. The leadership of the Pentagon, and the civilian leadership of the Department of the Navy, appear to support the BUR number. But the uniformed submarine community, and perhaps to some degree uniformed elements of the Navy outside the submarine community, continue to make reference to the older JCS requirement in their discussions of required SSN force levels. The slides attached to the end of this statement, taken from Navy briefings given to Congressional staffers at different points last year (plus one slide from a Navy-appointed independent NSSN review group), illustrate these continuing references to the higher JCS figures.

The parallel existence of these two separate and somewhat divergent statements of the SSN force-level goal over the last 19 months is a source of ambiguity and possibly some confusion in submarine acquisition planning. This is particularly the case in light of the fact that civilian Navy officials who support the lower BUR requirement are now invoking the need for 10 to 12 SSNs with Seawolf-level stealth, even though this figure is part of the higher JCS requirement.

Eliminating this duality in requirement statements could involve explicitly renouncing the JCS requirement once and for all or revising the BUR requirement upward to the JCS figure.

The fact that the JCS force-level requirement has been cited in discussions of the future SSN force since September 1993 may raise questions about the status of other force-level goals requirements established by the Bottom-Up Review. If a JCS study that predates the BUR can be used to mount an implicit challenge to the BUR force-level requirement for SSNs, are other elements of the U.S. military force structure called for in the BUR also open to challenge?

Insofar as the BUR number tends to be cited by the civilian leadership of the Navy, while the JCS number is the product of the uniformed JCS staff and is cited by uniformed elements in the Navy, the continued reference to the JCS force-level goal might also raise a question concerning civil-military relations in the Pentagon.

Lastly, it is important to note that the JCS requirement calls for a force of 10 to 12 SSNs with Seawolf level quieting by the year 2012 -- and *not* 2010, as Navy officials have begun to state in the last few weeks. The difference between 2010 and 2012 is critical: Funding SSN-23 in FY1996 would be necessary to achieve a force of 10 to 12 boats with Seawolf-level stealth by the year 2010, but it would not be necessary to achieve such a force by 2012.

The JCS study, first done in 1992, may have looked an even 20 years into the future, to the year 2012. The year 2012 might thus be somewhat arbitrary. Threat projections that far into the future, moreover, are unavoidably "fuzzy" to some degree. It is thus reasonable for someone to state, as a matter of personal opinion, that we need 10 to 12 boats with Seawolf level stealth by the year 2010 rather than 2012. But it is equally reasonable on this basis to go two years the other way and state, as a matter of personal opinion, that we don't need to achieve such a force until 2014. And these would only be personal opinions. The JCS requirement is for the year 2012, not 2010. Four of the briefing slides attached at the end of this statement note the 2012 date.

Factors driving the requirement

Roles and Missions of Attack Submarines

As stated in the 1993 CRS report entitled Naval Force-Structure Planning: Breaking Old Habits of Thought, it is an oversimplification, particularly in the

post-Cold War era, to think of attack submarines solely or even primarily as platforms for countering adversary submarines:

> During the Cold War, U.S. attack submarines were justified primarily in connection with the need to counter Soviet submarines. As a result, U.S. attack submarines are often thought of primarily as antisubmarine warfare (ASW) platforms, and some have questioned the need for U.S. attack submarines in light of the decline in Russian naval capability.
>
> Attack submarines, however, can perform a variety of missions aside from ASW, including covert surveillance and reconnaissance, covert insertion and extraction of spies and special forces, covert Tomahawk cruise missile strikes, covert mining of harbors and coastal areas, and anti-surface warfare. These missions can be performed either independently, or in support of other U.S. military forces. Even during the Cold War, it was probably an oversimplification to think of attack submarines solely as ASW platforms; they performed covert surveillance and insertion/extraction operations as well. In the post-Cold War era, the Navy has indicated that missions other than ASW will receive increased emphasis. In determining requirements for attack submarines, policymakers arguably should consider not just ASW, but the full range of missions that these platforms can perform.

Requirement for overall numbers

As discussed in the Bottom-Up Review, requirements for an attack submarine force of up to about 45 boats are driven by both warfighting considerations (i.e., fighting two nearly simultaneous major regional contingencies) and peacetime deployment considerations (i.e., maintaining forward deployments of attack submarines for purposes of intelligence and surveillance, and for responding rapidly at the outset of a crisis or conflict).

Requirements for an attack submarine force of more than about 45 boats are driven primarily by peacetime deployment considerations. As discussed in the 1992 CRS report entitled Naval Forward Deployments and the Size of the Navy, when limits on personnel tempo, requirements for maintenance and training, and time lost transiting to and from the operating area are fully taken into account, it takes an average of 5.7 attack submarines to keep one continuously deployed in an operating area somewhere around the periphery of Eurasia.

Navy representatives have stated openly that in recent years, 3 or 4 attack submarines have been forward-deployed to the Mediterranean to meet the needs of the theater CINC responsible for that area. In light of this example, it can be seen how CINC demands for submarine deployments to the Mediterranean, the Western Pacific, the Indian Ocean/Persian Gulf region, and the Arctic could total 10 or more boats, requiring a force of 57 or more attack submarines.

Requirement for Unit Characteristics

In the post-Cold War era, the need for building attack submarines with a certain level of unit capability is driven by both non-Russian and Russian considerations:

- The need for building submarines that can be changed and adapted over time with relative ease to perform missions differently or to perform new missions is tied to the traditional naval planning concern about ensuring the continuing usefulness of a major weapon platform that will remain in service over a period of 30 years. This concern that has been reinforced by the uncertainties regarding the development of the international security environment in the post-Cold War era.

- The need for submarines with features for operating in littoral (near-shore) areas is tied to the Navy's post-Cold War emphasis on preventing and containing non-Russian-oriented regional crises and on participating along with other U.S. forces in joint operations in major regional contingencies.

- The need for having some number of attack submarines with Seawolf-level stealth appears to be tied primarily to the need to avoid Russian submarine detection systems and to counter quiet Russian submarines such as the Akula II class and the successor class known as the P-IX (Papa Nine). Seawolf-level stealth, however, might also have some value in certain future non-Russian-oriented regional operations as well.

The charts on the next two pages are Navy representations of how the Russians now have, for the first time, a class of SSNs (the Akula IIs) that is quieter than our quietest in-service class of SSNs (the Improved SSN-688s, or 688Is). The charts also illustrate how boats with Seawolf-level-stealth (the Seawolf and New Attack Submarine designs) are projected to recover a narrow margin of quieting superiority for the U.S. attack submarine fleet.

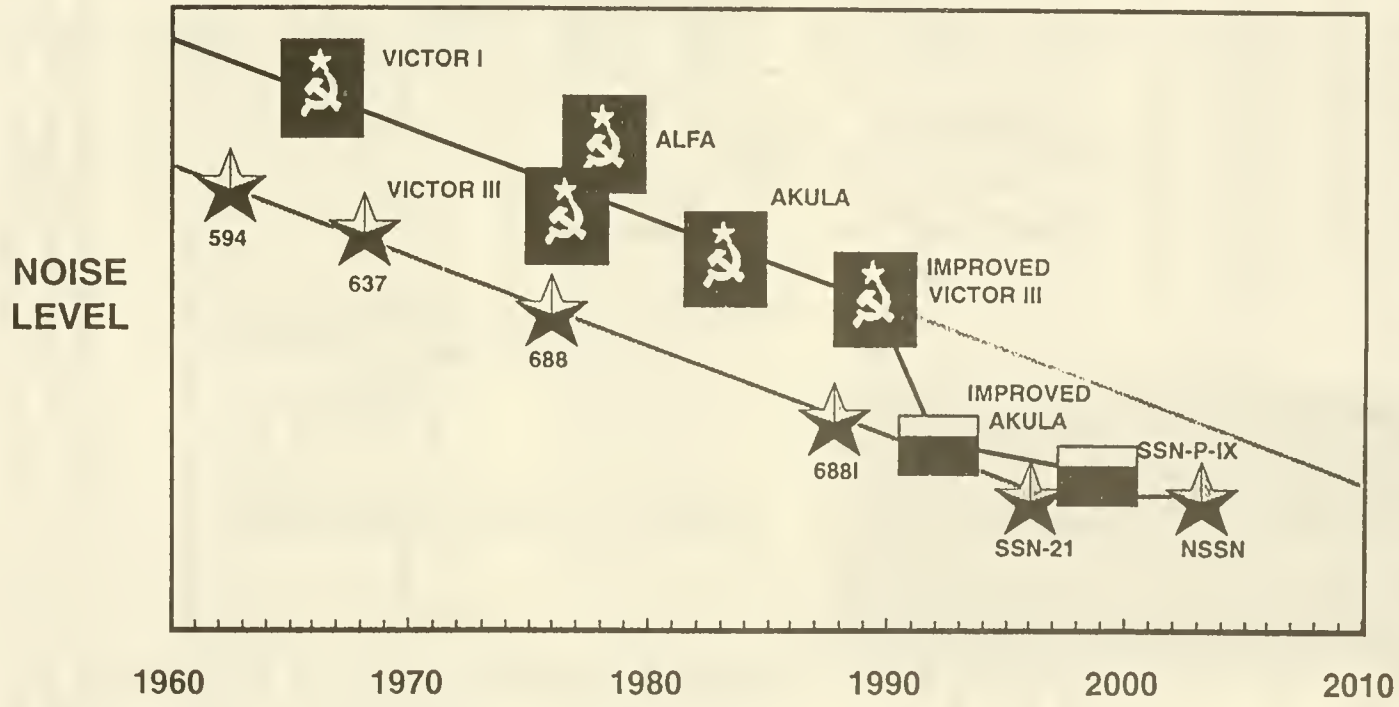
Importance of Quieting

In terms of assessing a submarine's ability to prevail in a fight against another submarine, there are several factors that can be considered, including ship characteristics such as speed, maneuverability, and maximum depth. The overall superiority of the best U.S. SSNs over the best Russian SSNs has traditionally been based on four other factors in which U.S. SSNs have historically had an advantage.

One of these is quieting -- the amount of noise the submarine makes relative to the amount of noise the other submarine makes.

A second is combat system sophistication -- the ability of the sonars and associated computers on the submarine to detect the noise made by the other submarine, relative to the ability of the sonars and associated computers on the

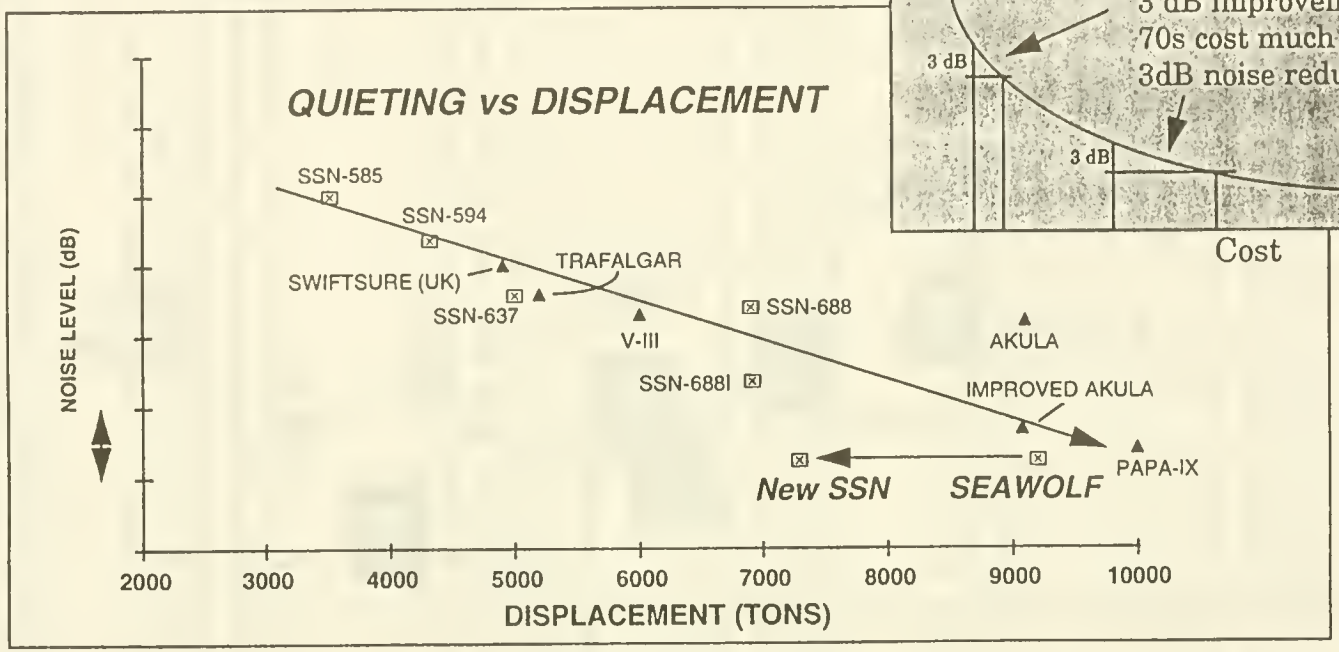
Preserving Warfighting Superiority

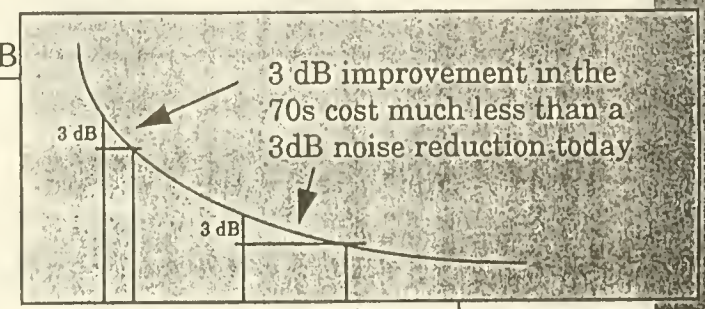


N87

New SSN Quieting- Revolutionary

- The *cost* of reducing acoustic signature
  - ➤ Pushing technological limits





- ➤ *Breakthrough*- SEAWOLF quieting in a smaller hull

other submarine to do likewise. Together, quieting and combat system sophistication determine which submarine will be the first to detect, localize, and develop a firing solution on the other submarine, and at what range, and at what risk of counterdetection.

A third factor is weapon quality, which includes the sophistication of the guidance package in the front end of the torpedo.

A fourth is crew quality, which is a function of recruiting, training and teamwork.

All factors considered, 688Is are probably more capable than Akula IIs. But the foundation of superiority that the best in-service U.S. SSN has over the best in-service Russian SSN has narrowed, because it no longer includes quieting. The Navy projects that quieting advantage will be recovered with the commissioning of Seawolf-level-stealthy SSNs, but as noted earlier, the recovered margin of quieting superiority is projected to be quite small. Under some circumstances, in fact, such a narrow margin in radiated noise could prove irrelevant.

Of the three other pillars of superiority, two of them -- combat system and weapon quality -- are dependent in part on computer hardware and software. Restrictions on exports of higher-capability computer technology have been relaxed in recent years, and Russia has mathematicians capable of designing sophisticated software algorithms. Consequently, the U.S. margin of superiority in these two areas could also narrow in the years ahead.

Russian submarine production

There appears to be little disagreement about the capability of the submarines that the Russians are now building. The debate centers more on the rate at which the Russians will build them. During the latter years of the Cold War, the Soviets built about 8 submarines per year of all kinds -- about 4 nuclear-powered units, and about 4 non-nuclear powered units, some of which were exported to client states. In 1991, the head of the Soviet Navy told visiting U.S. Navy officials that in the future, the plan was to build 3.5 submarines per year -- 1.5 nuclear-powered boats and 2 non-nuclear-powered boats, of which 1 would be offered for export.

The question is whether the Russians will be able to maintain a building rate of 1.5 nuclear-powered units per year, or whether economic and social conditions will limit production to some lower rate, such as 1 per year or 0.5 per year.

Why are the Russians engaged in a fairly determined effort to design and build new-generation submarines when the other parts of their military, and their economy and society as a whole, are undergoing stress and may even be in various states of collapse? Why has submarine production, in other words, been singled out as such a high-priority activity?

There are at least three possible explanations, all of which could be involved. The first has to do with Russia's status as a major world power. At present, perhaps the one thing maintaining Russia's status as a major world power is its substantial force of long-range nuclear weapons. As a result of arms control agreements, Russian ballistic missile submarines in the future will account for a much larger share of Russia's long-range nuclear missile warhead inventory than has been the case in the past. The Soviet Navy, now the Russian Navy, traditionally has used attack submarines to help protect its ballistic missile submarines from possible wartime attack by enemy submarines. Thus, the Russians may view attack submarines as increasingly important to maintaining Russia's status as a major world power.

A second potential explanation has to do with the possibility of a reconstitution of Russian conventional military capability 10 to 20 years from now. Given the long time needed to build submarines, particularly nuclear-powered submarines, an effort on the part of Russia to reconstitute itself as a major world conventional military power 10 to 20 years from now might have to begin today with production of nuclear-powered submarines. Submarine production, in other words, may be the "long pole in the tent" of an effort to reconstitute Russia's conventional military power.

A third possible reason is that these submarines are being built as a jobs program -- to maintain social tranquility in the communities that build them. Construction of Russian nuclear-powered submarines is being consolidated at Severodvinsk on the White Sea. The submarine yard there is reportedly the area's largest employer, employing about one-quarter of Severodvinsk's population of 250,000. Building submarines may be viewed as less risky than attempting to convert this large workforce to alternate forms of employment.

With regard to potential alternate forms of employment, Russia currently has a shortage of adequate housing for its military personnel. The submarines Russia is now building each require about 10 million worker-hours (5,000 worker-years) of labor to build -- about the same as a U.S. submarine. According to information provided by the National Association of Home Builders, this amount of labor would be sufficient, in the United States, to build about 11,000 apartment-style living units of about 900-square feet each (i.e., two-bedroom apartments) to U.S. building standards. (Measured another way, submarines like the Akula II, if built in the United States, would each cost about as much as an SSN-688 -- about $1.4 billion.)

It can also be noted that Russia is devoting significant and scarce resources to building new submarines at a time when scores of Russian submarines decommissioned in the last few years are tied up at pier awaiting shipyard defueling, dismantlement, and disposal work.

SSN Procurement Rate

A question frequently asked in discussions of U.S. submarine acquisition is whether there can or should be a hiatus in submarine procurement for some number of years. This question is to a large degree moot, because we are

already programmed to have a decade-long near-hiatus in submarine procurement during the 1990s. If Administration plans are carried out, then during the decade of the 1990s (FY1990-FY1999), we will procure only 4 attack submarines. These are the last SSN-688 submarine in FY1990, the second Seawolf submarine (SSN-22) in FY1991, the third Seawolf submarine (SSN-23) in FY1996, and the first New Attack Submarine in FY1998. This works out to an average procurement rate of 0.4 boats per year for a period of ten years -- a near-hiatus of considerable length.

The near-hiatus in SSN procurement during the 1990s is an important factor to consider in assessing required future procurement rates. The challenge in maintaining overall numbers of SSNs is not in the short-term or the mid-term. The SSN-688s and the first two Seawolf submarines are sufficient to maintain a force of 60 or more boats out to the year 2007, without any additional procurement. The problem, rather, begins in the longer term, after 2020, when the 688 force, funded mostly in the 1970s and 1980s, will be mostly gone. This is when the attack submarine force will be composed only of boats funded from about FY1990 onward. It is at this time that the force-level effects of the 1990s near-hiatus in procurement could become manifest.

The long-term average required procurement rate for a given item (sometimes referred to as the steady-state procurement rate) is equal to the required force level divided by the expected service life. As shown in the table on the next page, assuming a 30-year life for SSNs, maintaining a 45-boat force would require a long-term (30-year) average procurement rate of 1.5 boats per year (45 divided by 30 is 1.5).

If the 1990s are considered to be the first 10 years of the 30-year procurement period, and if 4 attack submarines are procured during this decade, then the other 41 boats must be procured in the remaining 20 years of the period. This equates to an average procurement rate of 2.05 boats per year (41 divided by 20 is 2.05). Thus, as a result of the near-hiatus in submarine procurement during the 1990s, a procurement rate of more than 2 boats per year would be required to maintain a force of 45 boats -- the low end of the BUR range -- through the 2020s.

Another way to state this is to say that an average of 15 boats must be procured each 10 years. If 4 attack submarines are procured during the 1990s, then the procurement rate will have fallen 11 boats behind this pace, and maintaining a force of 45 boats will require that these 11 boats be added to the procurement profile for the remaining 20 years of the 30-year procurement period.

The table shows the analogous procurement rates for maintaining a force of 51, 55, or 67 boats through the 2020s following the 1990s near-hiatus in procurement -- 2.35, 2.55, and 3.15 boats per year, respectively.

TABLE 1. SSN FORCE LEVELS AND PROCUREMENT RATES

Force level	Procurement rate to sustain force level through 2020s			
	Steady state rate for 30-year period FY1990-FY2019	Rate after 1990s near-hiatus (FY2000-FY2019)	With extended hiatus (30-year life for all existing SSNs)	
			Procurement hiatus until	Resulting rate
45	1.5	2.05	FY2002*	2.4
51	1.7	2.35	FY2000*	2.45
55	1.8	2.55	FY2000*	2.65
67	2.2	3.15	FY1997**	2.8

Source: Prepared by CRS, March 1995, based on U.S. Navy data. See text for methodology and discussion.

* Assumes 10-year construction period for first submarine procured when procurement resumes.

** Assumes 7-year construction period for first submarine procured when procurement resumes.

Thus, the near-hiatus in submarine procurement of the 1990s has already produced a requirement for an attack submarine procurement bow wave for the period after the turn of the century. As shown in the graph on page 12, unless submarines are procured at an average rate of more than 2 ships per year for the 20-year period starting in FY2000, SSN force levels would fall below the stated minimum required figure of 45 boats.

If submarines now under construction or in operation are kept in service until they reach age 30, then a minimum BUR-sized force of 45 boats can be maintained to the year 2012 without fielding any additional submarines. Assuming a 10-year construction period for the first boat to be procured at the end of a procurement hiatus extending to the year 2000 or beyond, the next submarine would not have to be procured until about FY2002. Extending the submarine procurement hiatus out to FY2002, however, would further increase the procurement rate that would need to be maintained once procurement of submarines resumed.

If the hiatus in submarine procurement were extended to FY2002 (i.e., no submarines are procured during the period FY1996-FY2001), then only 2 attack submarines (the last SSN-688 and SSN-22, funded in FY1990 and FY1991) will have been procured in the first 12 years (FY1990-FY2001) of the 30-year procurement period. Maintaining a 45-boat force through 2020s would then

require procurement of 43 boats in the remaining 18 years of the period, or an average procurement rate of about 2.4 boats per year, as shown in the table above.

The table shows the analogous procurement rates for maintaining a force of 51, 55, or 67 boats through the 2020s following an extended hiatus in procurement -- 2.45, 2.65, and 2.8 boats per year, respectively.

In short, except for a 67-boat force, extending the procurement hiatus to the point where submarines must be procured to replace those retiring at age 30 increases the bow-wave effect.

One strategy for addressing the issue of the downstream procurement bow wave is to hope that in the long run -- that is, by the 2020s -- changes in the international security environment or in military technology will reduce the SSN force-level requirement and thus the required procurement rate. Such changes are possible. But it's also possible that changes between now and the 2020s will increase rather than decrease the SSN force-level requirement, making the procurement bow wave even steeper. If the former scenario occurs, the Nation will have avoided substantial submarine procurement costs. If it doesn't, then policymakers at that time will be presented with a substantially greater and possibly unaffordable procurement requirement.

THE "BRIDGE" ISSUE -- FUND SSN-23 IN FY1996?

Sunk Cost on SSN-23

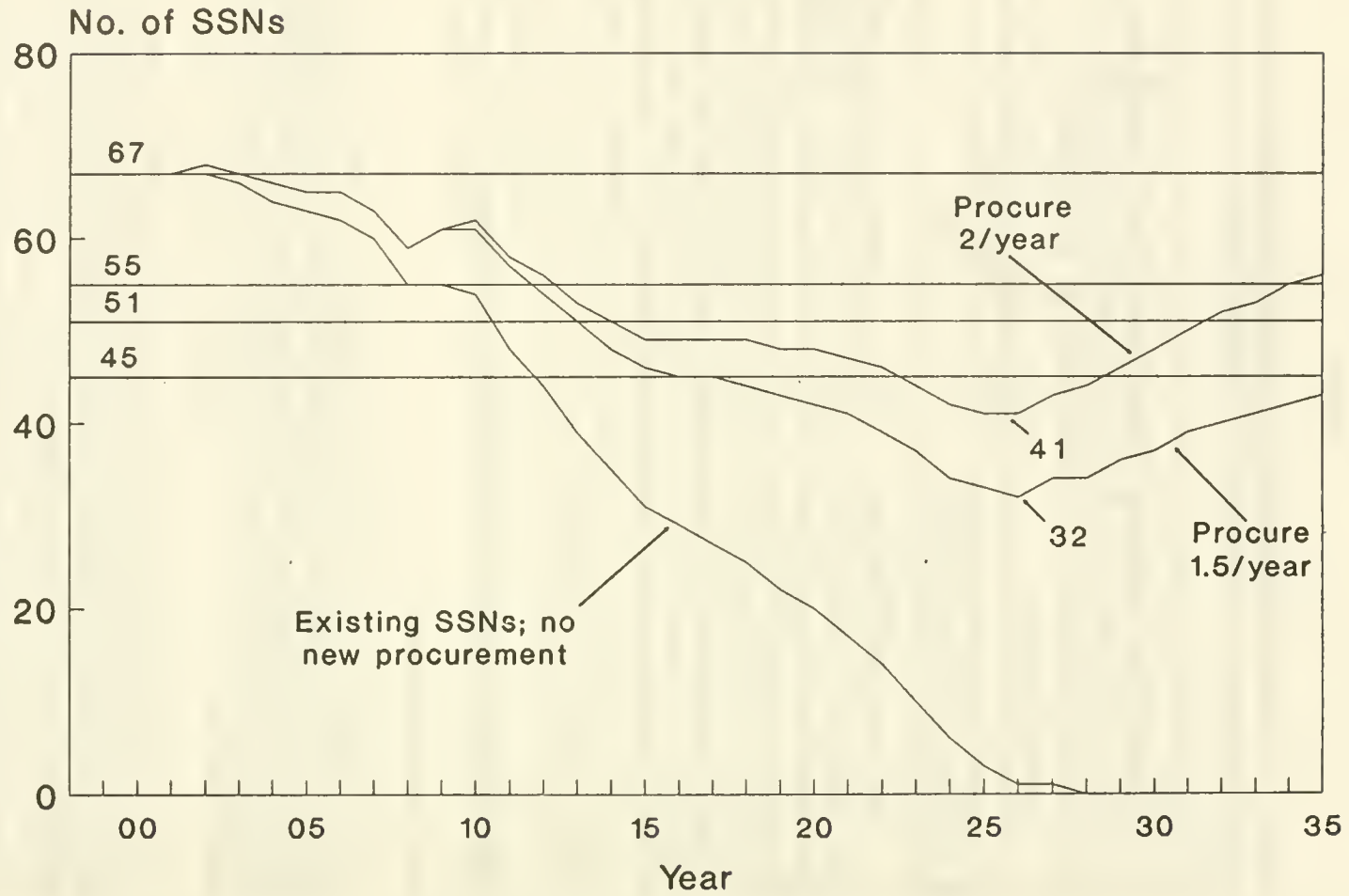
It is sometimes said that the sunk cost to date on SSN-23 is roughly $900 million, and that therefore only another $1.5 billion in additional expenditures are needed to finish the boat, which has a total cost of about $2.4 billion. This statement, which has been made at various times over the past year or so, is not entirely accurate.

About $920 million in prior-year funding is available for obligation toward SSN-23 -- about $380 million in FY1990 and FY1991 advanced procurement funding for SSN-23, and $540.2 million in additional funding that Congress appropriated as part of a 1992 rescission bill.

The $380 million in FY1990-FY1991 funding has been almost completely obligated and expended. Only a portion of the $540.2 million in 1992 funding, however, has been obligated, and only a portion of that has been expended. Of the total of about $920 million available for obligation, as of March 8, 1995, $707.0 million has been obligated and $389.1 million had been expended.

SSN force levels

1998-2035, 30-year life



Source: Prepared by CRS, 3/95, based on U.S. Navy data.

If SSN-23 is not built, some of the unexpended funding from the $920 million would probably have to be used to pay for contract termination costs, costs to support certain key submarine component manufacturers, increased overhead costs on SSN-21 or SSN-22, or increased construction costs on the first New Attack Submarine. But some of the unexpended funding might be recoverable.

In short, although about $1.5 billion in new (i.e., FY1996) budget authority is needed to complete funding for SSN-23, the amount of money that needs to be expended to finish SSN-23 as of early March was about $2 billion ($2.4 billion less $389.1 million expended).

Primarily An Industrial Base Issue

Funding SSN-23 would add to the U.S. attack submarine fleet a very capable submarine of which the Navy and the Nation could make considerable use for a period of 30 years. Funding SSN-23 would also marginally contribute to the Administration's goal of maintaining an attack submarine force of at least 45 boats, and it would advance the Navy one boat closer to the 1993 JCS goal of having 10 to 12 attack boats with Seawolf-level stealth by 2012.

Funding the SSN-23 in FY1996, however, is not absolutely necessary to achieve the Administration's goal of maintaining a force of at least 45 attack submarines. The absence of SSN-23 from the force structure could be made up by procuring one additional NSSN at some later point.

Nor is funding SSN-23 in FY1996 absolutely necessary to achieve a force that includes 10 to 12 Seawolf-level-stealthy boats by 2012: Two Seawolf-level-quiet boats -- SSN-21 and SSN-22 -- have already been funded, and as shown in the table below, under the Administration's current plans, another 9 to 11 NSSNs (which would be Seawolf-level-quiet boats) would be funded between FY1998 and FY2006 (and would thus be in service by 2012).

TABLE 2. POTENTIAL NSSN PROCUREMENT PROFILES, FY1996-FY2006

98	99	00	01	02	03	04	05	06	Total
1	0	1	0	1	1	2	1	2	9
1	0	1	0	1	2	1	2	1	9
1	0	1	0	1	2	2	2	2	11

Source: Prepared by CRS, based on U.S. Navy data.

Thus, with regard to meeting stated goals for U.S. attack submarine capability, funding SSN-23 in FY1996 would be militarily helpful but is not

militarily absolutely necessary. Consequently, the question of whether it is necessary to fund SSN-23 in FY1996 revolves primarily not around military necessity but rather around industrial-base necessity -- whether it represents the best option for maintaining the submarine construction industrial base until the start of a follow-on submarine program.

The Issue: Two Nuclear Construction Yards or One?

Whether it is necessary to fund some kind of submarine construction work in FY1996 depends to a large degree on one's preferred industrial arrangement for building nuclear-powered ships in the years ahead. Two main alternative arrangements have been discussed for building nuclear-powered ships:

- the 2-yard, or split, arrangement, in which the Electric Boat Division (EB) of General Dynamics Corporation builds nuclear-powered submarines and Newport News Shipbuilding (NNS) builds nuclear-powered carriers, and

- the 1-yard, or consolidated, arrangement, in which production of both submarines and carriers is consolidated at NNS.

EB officials and the Navy state that EB, as a shipyard that builds only submarines, cannot maintain its submarine construction capability until FY1998 unless it receives additional submarine construction work in FY1996. Few observers have argued with this statement.

NNS officials have testified that NNS, as a shipyard that builds nuclear-powered aircraft carriers as well as nuclear-powered submarines, can if necessary maintain its submarine construction capability out to the turn of the decade without receiving additional submarine construction work between now and the turn of the decade, if (1) the nuclear-powered aircraft carrier CVN-76 is funded and built at NNS, and (2) NNS receives some submarine overhaul and repair work that would normally go to the naval shipyards. The first of these conditions has been met: CVN-76 was funded in FY1995, and the contract to build it has been awarded to NNS. Fulfilling the second condition would affect the workload for the government-operated naval shipyards.

Thus, a decision to split production of nuclear-powered warships between EB and NNS implies a need for funding some kind of submarine construction work for EB in FY1996, while a decision to consolidate production of nuclear-powered warships at NNS could permit the option of not funding any submarine construction work in FY1996 (provided that some submarine overhaul and repair work were transferred to NNS from the naval shipyards).

The issue, in short, is whether there should be two nuclear construction yards (EB and NNS) or one (NNS only). The Clinton Administration, as part of its Bottom-Up Review of U.S. defense policy, explicitly stated a preference for the 2-yard arrangement. The Bush Administration, by seeking in 1992 to rescind funding for SSN-22 and SSN-23 (the second and third Seawolf-class submarines, funded in FY1991 and FY1992, respectively), and by including

funds for the procurement of no other submarines until the first NSSN in FY1998, appeared to express an implicit preference for the 1-yard strategy.

Arguments For Two Yards vs. One

The principal argument in favor of the 2-yard strategy concerns production capacity. Currently, EB and NNS can each build up to 3 submarines per year. The 2-yard strategy thus preserves the option to reconstitute a second submarine construction program (at NNS) to respond to a need to procure submarines at a rate of more than 3 submarines per year. Assuming a 30-year life for submarines, a steady procurement rate of 3 boats per year would be sufficient over the long run to maintain a combined force of 90 ballistic missile and attack submarines.

Current plans call for a combined force of 59 to 81 submarines (14 ballistic missile submarines plus 45 to 67 attack submarines). Assuming a 30-year life for submarines, a force of 59 to 81 boats can be maintained over the long run with a 30-year steady-state production of 2 to 2.7 boats per year. This is less than the 3 boats per year that could be produced by a single yard.

A procurement rate of more than 3 submarines per year, however, might still become necessary, for three reasons.

First, as discussed earlier, the 1990s near-hiatus in submarine procurement has produced a bow wave situation in which maintaining a force of 45 SSNs through the 2020s will require a procurement rate of more than 2 attack submarines per year. If the 14 youngest ballistic missile submarines are replaced on a one-for-one basis when they retire, then a period will come after the turn of the century when there will be an additional requirement for one ballistic missile submarine per year for 14 years. This production would be in addition to any ongoing production of attack submarines. The combined procurement rate of attack and ballistic missile submarines could thus be more than 3 boats per year for several years.

Second, changes in the international security environment or in military technology may create a requirement for rapidly expanding the size of the attack submarine force from a BUR-like level of, say, about 50 boats to the high-end JCS figure of 67 boats. Accomplishing such a buildup in a short period of time could require a procurement rate of 4 or more boats per year for a period of several years.

Third, changes in the international security environment or in military technology could result in an increase in the attack submarine force-level requirement to a number even higher than the high-end JCS figure of 67 boats. Some analysts, for example, have argued that the vulnerability of surface combatants to advanced enemy anti-ship weapons in the early 21st Century could lead to a revised U.S. fleet architecture that relied more heavily on submarines to carry out various missions.

A second argument that has been made in favor of a 2-yard strategy is that it provides some protection against the possibility that nuclear-warship production at one of the two sites might be stopped by some unforseen development, such as a decision by the parent company of one of the shipyards to get out of the nuclear-warship business, a natural disaster, a serious environmental accident, or an intractable dispute between management and the workforce. The likelihood of events of this kind is difficult to quantify.

A third argument, put forth by Secretary of Defense Perry in an exchange with Senator John Warner at a hearing before the Senate Armed Services Committee on February 9, 1995 is that the existence of a dormant, alternate submarine construction yard (NNS) enables the government to employ a threat of "implicit competition," as Secretary Perry put it, against the active submarine yard (EB), so "if the yard that's building the nuclear submarines is performing inefficiently or fails, one can transfer the program down to the other yard. . . ."

The implicit competition argument is open to question, for three reasons. First, stopping submarine production program at EB in mid-stream and transferring it to NNS would cause great disruption in the U.S. submarine construction effort. The Defense Department would probably be reluctant to incur the costs associated with this disruption unless production problems at EB were very great indeed.

Second, it could take several years for production problems of this scale to manifest themselves. By that time, NNS might have been out of the submarine-construction business for so long that the time and cost to reestablish a submarine-construction activity at NNS could be viewed as prohibitive.

Third, transferring the submarine-building program to NNS would put EB at direct risk of going out of business. Carrying out the threat to transfer the program to NNS would risk closing out the option of keeping a second submarine yard (now EB) available for purposes of procuring more than 3 submarines per year. Defense Department officials might be reluctant to carry out an implicit threat to transfer the program to NNS for this reason as well, and EB officials would be aware of this.

The principal argument in favor of consolidating nuclear warship construction at NNS is that this may offer some economies of scope in nuclear warship design and construction not possible under the split arrangement. The argument is that submarines and carriers would bear the fixed costs associated with only one nuclear construction yard (NNS) rather than two (EB and NNS).

At a June 10, 1993 press conference, Mike Walsh, Chairman and CEO of NNS' parent firm, Tenneco, Inc., stated: "We estimate that if [the aircraft carrier] CVN-76 and the next four submarines were all built at [NNS], the cost savings for this group of ships would be in the range of $1.5 [billion] to $2.0 billion." This calculation may have been based on an estimate of EB's fixed costs in 1993, when EB employed about 18,000 people. Even assuming that this calculation was correct at the time, however, EB has embarked on an effort to significantly reduce its fixed costs as it downsizes over the next few years to a

firm of about 6,000 people. The savings associated with consolidating production at NNS thus might not be as great as what one might have estimated a few years ago.

With regard to production capacity, NNS officials recently told CRS that although NNS can currently produce a little more than 3 submarines per year, with the addition of a $5 million dollar crane, the yard's submarine production capacity could be increased to a bit more than 4 boats per year. Alternatively, if NNS' submarine production capacity remains at 3 boats per year, it might be possible to reestablish a second submarine-construction site -- at the EB location, or Ingalls Shipbuilding in Pascagoula, Mississippi (which built nuclear-powered submarines until the early 1970s), or at one of the naval shipyards (which also built nuclear-powered submarines until the early 1970s) -- to respond to a need to build more than 3 submarines per year. But reconstituting a second submarine-construction yard would involve more time, expense, and technical risk than under the Administration's 2-yard strategy. Also, if some unforeseen event shuts down production at NNS, the country would have no other facility capable of continuing production of nuclear-powered warships.

Bridging Options for a 2-Yard Strategy

If a split industrial arrangement -- a 2-yard strategy -- is preferred, and if procurement of the New Attack Submarine is to begin in FY1998, with advanced procurement funding in FY1996, then it appears that some kind of submarine construction work for EB would need to be funded in FY1996. There are at least four potential options for providing such work:

- fund SSN-23 (the Administration's plan)
- fund a portion of SSN-23
- fund construction of outfitted SNN-688 hull sections
- fund 1 or 2 SSN-688 class submarines

Building SSN-23 would contribute toward meeting the JCS goal of having 10 to 12 Seawolf-level-stealthy boats by the year 2012, although as discussed earlier, this goal can be met without funding SSN-23 in FY1996.

The option of funding construction of only a portion of SSN-23 -- such as the aft section, where the already-ordered propulsion plant would be installed -- has not been fully examined in public discussion. Building only a portion of SSN-23 might not preserve a sufficient business base at EB until FY1998, although this could be addressed by transferring some additional submarine overhaul and repair work to EB from the naval shipyards. And building only a portion of SSN-23 would not provide the Navy with a usable submarine. (The aft section might be used as a land-based training or research and development asset, but the Navy has not expressed a need for such an asset.) Building only a portion of SSN-23 could, however, be less expensive than procuring the whole submarine.

In assessing this option, Congress may wish to explore four questions: Would building only a portion of SSN-23 (and possibly transferring some submarine repair and overhaul work to EB) sufficiently maintain a submarine-construction capability at EB until FY1998? If so, would this cost less than funding SSN-23? If so, would the additional funding needed to procure SSN-23 be justified by the fact that this would provide the Navy with an additional submarine? If additional submarine overhaul and repair work is transferred to EB, how would this affect the workload at the naval shipyards?

The third option would involve building new hull sections that would be inserted into existing SSN-688 class submarines as a major shipyard conversion. The most likely approach would be to cut each SSN-688 in half forward of the reactor compartment, insert the newly built hull section, and then put the submarine back together in its new, lengthened form. The inserted section could be designed to carry additional cruise missiles, mines, special operations forces, or some other desired payload. The feasibility and costs of this option have not been explored. If technically feasible, this option might not be ready to implement soon enough to help maintain EB between FY1996 and FY1998. The cost might be a few hundred million dollars per boat. This option would provide the Navy with a few special-mission SSN-688s with expanded capabilities in certain areas. It would not, however, provide the Navy with any additional Seawolf-level-stealthy boats.

With regard to the fourth option, procuring a single 688I (which could cost $1.4 billion in FY1996 budget authority, less any unexpended funding from the $540 million provided in the 1992 Seawolf rescission bill that could be reprogrammed from the SSN-23 account) could be less expensive than completing the funding for SSN-23.

The Navy has argued, however, that a single 688I would not provide enough work to maintain EB's submarine-construction capability until the start of NSSN procurement in FY1998; the Navy has said two 688Is would be needed. A second 688I would require another $1.4 billion in new budget authority, bringing the total amount of new budget authority for a 688I-based strategy to a figure greater than the cost of new budget authority required for SSN-23.

SSN-23 would be much more capable than an additional 688I and would contribute to the Joint Staff goal of having 10 to 12 boats with Seawolf-level quieting by 2012, whereas additional 688Is would not. The Navy also argues that since it plans to incorporate mainly Seawolf technology rather than older 688I technology into the NSSN design, procuring SSN-23 could preserve the NSSN technological base better than procuring one or two additional 688Is.

In assessing this issue, Congress may wish to explore three questions: Would a single 688I provide enough work to maintain EB's submarine-construction capability until the start of NSSN procurement? If not, could a sufficient amount of work be provided by adding something less than a second additional 688I, and would this cost less than procuring SSN-23? How militarily useful would 1 or 2 upgraded 688Is be compared to SSN-23?

If the start of New Attack Submarine procurement is deferred beyond FY1998, the industrial base bridge for EB would have to be lengthened. For example, in addition to procuring SSN-23 or one or two additional SSN-688s in FY1996, additional Seawolf or SSN-688 class submarines might have to be procured in later years.

Bridging Options for a 1-Yard Strategy

If a consolidated industrial arrangement at NNS -- a 1-yard strategy -- is preferred, and if procurement of the New Attack Submarine is to begin in FY1998, then, as discussed earlier, policymakers have the option of not funding any submarine construction work in FY1996. As discussed earlier, this option may require the transfer of some submarine overhaul and repair work to NNS from the naval shipyards.

If the start of New Attack Submarine procurement is deferred much past the turn of the century, then NNS might have to be provided with some kind of interim submarine construction work.

THE FOLLOW-ON ISSUE: APPROVE FY1996 NSSN FUNDING?

NSSN vs. 688I and Seawolf

The Navy's goal for the New Attack Submarine (NSSN) program is to develop a multimission SSN that is (1) substantially less expensive than the Seawolf design, (2) capable enough to maintain U.S. undersea superiority against a reduced but still-continuing Russian submarine development and construction effort, (3) more capable than the Seawolf or 688I designs for operations in littoral (near-shore) areas, and (4) better able than the Seawolf or 688I designs to incorporate major new submarine technologies when they become available.

As envisioned by the Navy, the NSSN would be as quiet as the Seawolf, would have a submerged displacement of about 7,500 tons, and would be armed with a total of 38 weapons (including 12 additional Tomahawk cruise missiles in a 12-cell VLS). Compared to the 688I and Seawolf designs, the NSSN design would have improved features for operations in littoral waters, including better shallow-water maneuverability, a sail with a reduced radar cross section, and a better capability for covertly delivering special operations forces. The Navy estimates the procurement cost for follow-on NSSNs to be about $1.5 billion in FY1998 dollars, compared to $2.1 billion for additional Seawolf submarines or $1.4 billion for additional 688Is.

The Administration's position is that neither the 688I nor Seawolf designs are suitable for the post-Cold War era. The 688I design, the Administration argues, lacks Seawolf-level stealth and was not designed with littoral operations in mind. In addition, the Administration argues, the 688I's flexibility and adaptability are very limited because the 688I design has almost no available weight or space for additional equipment, does not have a torpedo room that can

be used as a reconfigurable space for specialized missions, and does not have modular reconfigurability to facilitate large-scale, modular insertions of new technologies that may become available in future years.

The Seawolf design, the Administration agues, does have Seawolf-level stealth as well as space and weight for additional equipment, but it is too expensive, was not designed with littoral operations in mind, does not have a reconfigurable torpedo room, and lacks modular reconfigurability. The table below summarizes the Administration's comparison of the 688I, Seawolf, and NSSN designs.

TABLE 3. SUBMARINE CHARACTERISTICS: THE ADMINISTRATION'S POSITION

	Cost	Quieting	Littoral features	Growth/flexibility/adaptability		
				Growth margin	Reconfigurable torpedo room	Modular recon-figurability
688I	X					
Seawolf		X		X		
NSSN	X	X	X	X	X	X

X = Satisfactory in the Administration's view.

In assessing the need to switch to a new design, Congress may consider whether the factors in the above table are important considerations and, if so, whether the scores shown for the 688I and SSN-21 designs on these factors are correct.

NSSN Affordability

As discussed in the 1994 CRS report, Navy New Attack Submarine (NSSN) Program: Is It Affordable?, a key measure of the affordability of the NSSN program is the share of the Navy's shipbuilding budget that would be required for NSSN procurement. This share will depend on the size of the shipbuilding budget, the NSSN procurement rate, and the NSSN's unit procurement cost.

Under the recapitalization plan it presented to Congress last year, the Navy stated that it wanted to increase the shipbuilding budget (the Shipbuilding and Conversion, Navy [SCN] appropriation account) from its current level to about $9.4 billion in FY1998 dollars by the turn of the century. The submarine community would like to procure the NSSN at a rate of two per year starting around FY2003; Navy testimony on its long-range plan suggested a budgeted rate of 1.5 boats per year. The cost goal for the NSSN program is to have follow-on boats in the class (i.e., the fifth or sixth boat in the series, and those that follow) cost $1.5 billion each in FY1998 dollars.

During the Cold War, procurement of attack submarines accounted for an average of about 20 percent of SCN. In its testimony last year, Navy officials suggested that about 26 percent of a $9.4 billion annual SCN budget would be allocated for procurement of 1.5 NSSNs per year.

The 1994 report on the affordability of the NSSN program concluded the following:

- If the NSSN procurement rate is 1.5 boats per year, the Navy is successful in its plan to increase SCN to $9.44 billion by the turn of the century, and the NSSN's unit procurement cost is $1.5 billion, then NSSN procurement will require 24 percent of SCN -- a share not much higher than Cold War average of 20 percent, and slightly less than the 26-percent allocation mentioned in the Navy's testimony last year;

- If the NSSN procurement rate is 2 boats per year, then NSSN procurement will require more than 30 percent of SCN, even if SCN is $9.44 billion and the NSSN's unit procurement cost is $1.5 billion. This is somewhat higher than the 26-percent allocation mentioned in the Navy's testimony, and significantly higher than the Cold War average of 20 percent;

- If SCN falls short of $9.44 billion or the NSSN's unit procurement cost exceeds $1.5 billion, or both, then for a procurement rate of 1.5 boats per year, the share of SCN required for NSSN procurement could approach or exceed 30 percent. For a procurement rate of 2 boats per year, it could approach or exceed 40 percent.

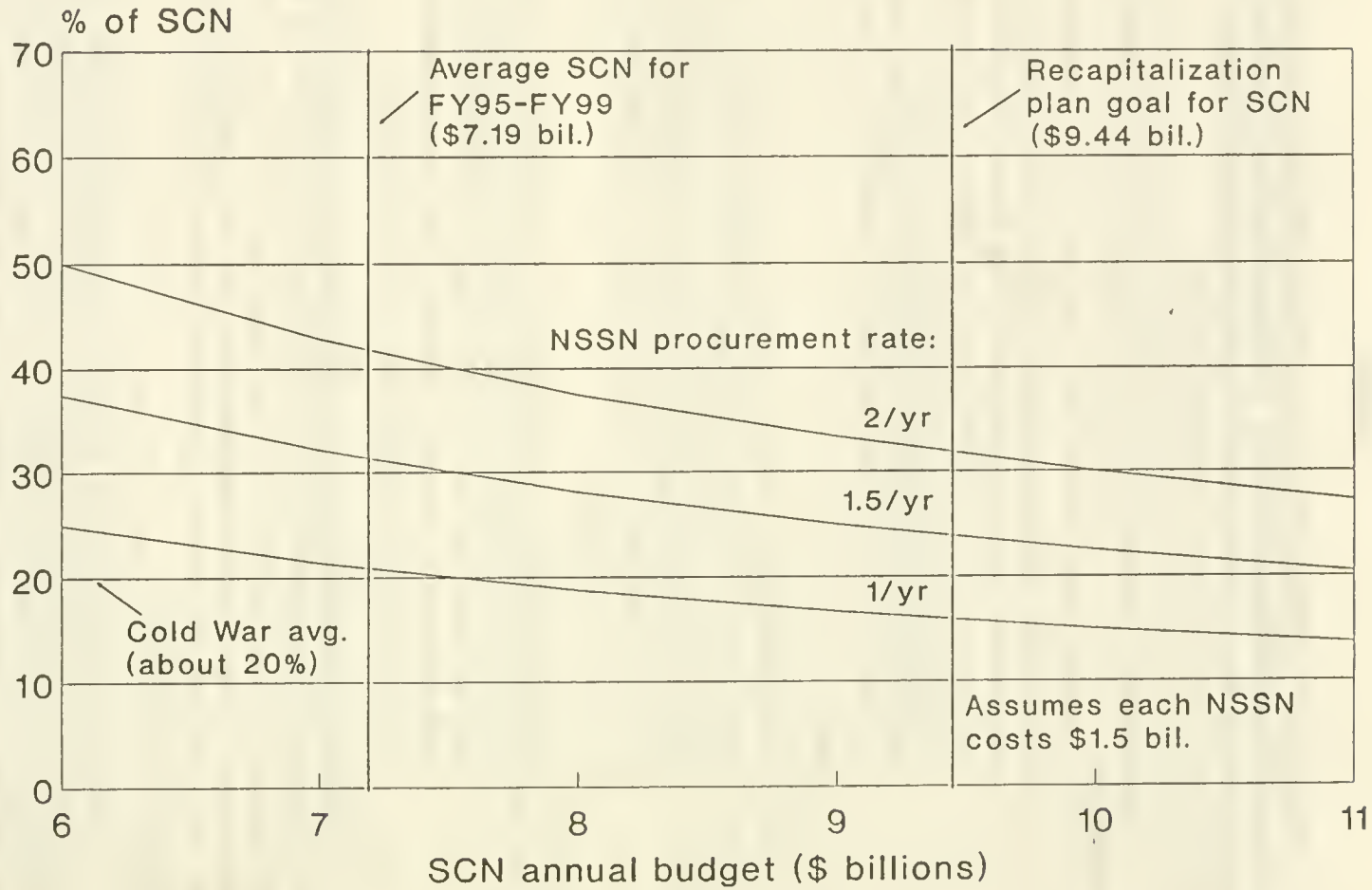
In assessing these conclusions, it can be recalled that, given the near-hiatus in submarine procurement during the 1990s, maintaining a force of 45 attack submarines through the 2020s will require a procurement rate after the turn of the century of slightly more than 2 boats per year, while maintaining a force of 51, 55, or 67 boats will require a procurement rate of 2.35, 2.55, or 3.15 boats per year, respectively.

The graph on the next page, taken from the 1994 report, shows the NSSN program's share of SCN as a function of the size of the SCN account and the NSSN procurement rate. The NSSN's unit procurement cost is assumed to be $1.5 billion; if it turns out to be higher or lower, then the three sloping lines on the graph will shift up or down, respectively (i.e., for any given SCN size and procurement rate, the share of SCN required for NSSN procurement would be higher or lower, respectively).

Figure 1

SSN procurement as % of Navy's shipbuilding budget (SCN)

(FY1998 dollars)



Prepared by CRS, 6/94, based on U.S. Navy data. See text for discussion.

The design of the NSSN has progressed to the point where its procurement cost appears to have been determined to within plus or minus 5 percent. In other words, changing the design of the NSSN where possible at the margin might increase or decrease the cost of the ship by about 5 percent. Achieving a major reduction in the cost of the ship through design changes would likely require a substantial or complete redesign of the boat and of the components that are to be installed in it, which would defer procurement of the first NSSN from FY1998 to some later year.

NSSN Design vs. Milestone Process

The history of the design effort for the New Attack Submarine raises a potential question for the future regarding the fit between the ship design process, particularly for nuclear-powered submarines, and the DOD Milestone Acquisition process. In short, it appears that the design of the NSSN was more advanced at various points over the last five years than what the milestone process would have suggested.

The NSSN program received Milestone 0 approval in August 1992. This permitted the Navy to begin exploring conceptual design alternatives for the NSSN. In reality, however, such conceptual work was underway in the Navy by 1990.

Similarly, the NSSN program received Milestone 1 approval in August 1994. This permitted the Navy to select a particular conceptual design for the NSSN and move it into the preliminary design process. In reality, however, the Navy had selected and begun to work on a particular conceptual design by 1992.

The Navy briefing chart on the next page provides a time line of events in the NSSN design effort in relation to Milestone 0 and Milestone 1.

The Cost and Operational Effectiveness Analysis (COEA) for the NSSN program, prepared in support of the Milestone 1 decision, was forwarded to Congress in September 1993. According to a Dec. 7, 1993 letter from Senator Alfonse D'Amato to Under Secretary of Defense for Acquisition John Deutch, the COEA concludes, in unclassified form (ellipses as in the letter):

> The COEA analysis showed that the 688I Upgrade ... can carry out the missions, but is more vulnerable than other ... alternatives. The acceptable level of vulnerability is a matter of judgement.
>
> - If the vulnerability of the 688I Upgrade is judged acceptable, build 688I Upgrades and minimize near-term expenditures;
>
> - If the vulnerability of the 688I Upgrade is judged too high:

NEW ATTACK SUBMARINE: PRE-MILESTONE 1

88-90	NAVSEA/NR Focus on SEAWOLF Follow on
1990	SECNAV/CNO/NAVSEA/NR Discussions Studies and Testing Coordinated Maintain SEAWOLF Stealth Trade Speed for Cost Simplify
2/91	SECNAV Issues New Attack Sub Tasking - CNO - requirements - NAVSEA - ship evaluations - NR - propulsion plant
6/91	OPNAV Staff Requirements Report Submarine Operational CDR Input
2/92	CNO Issues Requirements Range
1992	Numerous NAS Concept Briefs: OSD, JCS, Congress
→ 8/92	Milestone 0
1993	Submarine Operator-Design interface Teams Established
9/93	Joint Staff Approves Basic Submarine Characteristics
→ ~~X~~ 6/94	Milestone 1

- If we are going to build only a few submarines, build SSN-21 and avoid the $4 [billion] to $5 billion R&D bill of a new design;

- If we intend to enter serial production of more than 10 units, we should select among new design alternatives.

In terms of the familiar traffic-light analogy, Members of Congress who rely on the Milestone process and on COEAs to inform their decisions on major weapon acquisition issues might have been looking for a strong green light from the COEA to support a decision to go ahead with the NSSN program. The conclusion above does not appear to provide a strong green light.

The Navy, however, was already well into the design effort for the NSSN by the time the COEA was completed, and appeared to be satisfied with the COEA as long as it did not provide a red light against proceeding with the Navy's general idea for what the NSSN should be. The conclusion above does not appear to provide a red light.

Given the long time needed to design a nuclear-powered submarine, and the need to make important design decisions early in the design process, the time line for the Navy's NSSN design effort appears reasonable. But this time line does not appear to fit very well with the Milestone process as currently structured. As a result, Members of Congress who rely on the Milestone process to monitor a submarine-design effort run the risk of having an understanding of the program's status that lags behind actual events.

One option to prevent this situation from recurring in future submarine design efforts would be to revise the Milestone process so that it can better accommodate the requirements of the submarine-design process. Another option would be to keep the Milestone process as it is, exempt submarine-design efforts from this process, and devise an alternate oversight process that fits the requirements of the submarine-design process.

Competing the NSSN Program

In recent weeks, some Members of Congress have inquired about the possibility of competing NSSN production between EB and NNS rather than allocating it to EB, as the Administration plans. In response to these inquiries, some Navy officials have stated that the program cannot be competed in its early years because of the low early procurement rate planned for the NSSN, but that it might be competed later, when the program reaches a procurement rate of 2 boats per year.

The feasibility of competing the NSSN program when it reaches a rate of 2 boats per year is open to question on several counts. First, it is not clear, given the affordability situation discussed earlier, that a procurement rate of 2 boats per year will be achieved; the rate might turn out to be closer to 1.5 boats per year.

Second, even if a rate of 2 boats per year is achieved, this would not appear to be sufficient for holding a meaningful competition between two yards. The minimum sustaining production rate for EB might be 1 boat per year, while for NNS, which also builds surface ships, it might be about 0.5 boats per year. If so, the combined minimum sustaining production rate for the two yards would be 1.5 boats per year, and the two yards would in effect be competing for only a half a boat per year. This would not appear to generate much competitive leverage for the Government.

The Administration last year in effect decided that, for FY1994 and FY1995, a rate of 3 DDG-51 destroyers per year was insufficient for maintaining a meaningful competition between the two shipyards currently building these ships without risking the financial health of these yards. The Navy, moreover, is now reassessing its acquisition strategy for this type of ship, which has a planned procurement rate of 2.67 ships per year during the FY1996-FY2001 Future Years Defense Plan (FYDP). The situation regarding surface combatant construction differs in some respects from the situation regarding submarine construction. Even so, if a meaningful competition between the two surface combatant builders is difficult to maintain at a rate of 2.67 ships per year, how can one be maintained between two submarine builders at a rate of 2 ships per year?

Third, even if a meaningful competition can be achieved, the total production run for the NSSN program may not be large enough for the cost savings achieved through competition to offset the added costs of splitting the production learning curve between two yards. For example, if the NSSN design is procured for a period of 15 years (FY1998-FY2012) and is then succeeded by a follow-on design, if competition does not begin until a procurement rate of 2 boats per year is achieved, if the result of the result of competition is to divide the competed boats evenly between the two yards, and if the yards achieve an 87 percent learning curve on the program (the same learning curve that EB has testified that it achieved on the Trident submarine program), then the effect of splitting the learning curve between two yards would be to add about 13 percent to shipyard construction costs for the program compared to the costs of building all the ships at one yard. This does not include any added costs that might be incurred as a result of materials being ordered by two yards in smaller quantities rather than by one yard in larger quantities.

If competition is not introduced until the procurement rate reaches two per year, the first boat to be competed would be the fourth boat procured. If the yard that built the first three boats achieves an 87 percent learning curve on NSSN production, then this yard would have a 24 percent cost advantage over the other yard in bidding for the fourth boat due to learning-curve effects alone. This does not include any additional cost advantage due to the reconstitution costs that the other yard would face to reestablish submarine production after a hiatus of several years.

If the objective is to employ competition in building NSSNs, another approach would be to hold a competition at the start of NSSN procurement and have it be a winner-take-all competition. This could generate significant

competitive leverage for the Government, and it would avoid the added costs associated with splitting a low-production-rate program between two sources.

If a winner-take-all competition were held for NSSN production, the question of whether there should be a split or consolidated arrangement for nuclear warship construction would be decided not by deliberate policy choice, but as a consequence of the outcome of the competition.

To ensure that an up-front, winner-take-all competition for building NSSNs is conducted on a level playing field, certain actions might have to be taken, including the following:

- SSN-23 or some other type of submarine construction work for EB might have to be funded in FY1996 to ensure that EB could be a healthy competitor in FY1998.

- Funding might have to be provided to maintain NNS's submarine-construction capability until FY1998 on a level equal to EB's, and the one-time costs of reconstituting submarine production at NNS in FY1998 after a hiatus of a few years might have to be addressed in the bidding process.

- NNS would need to be maintained as a full observer and consultant, if not a direct participant along with EB and the Navy, throughout the NSSN design process, so that NNS would have an understanding of the NSSN design equal to EB's.

- Any features incorporated into the NSSN design to help optimize the design specifically for EB's production processes and methods would have to be removed from the design, so that the design does not provide EB with a built-in cost advantage.

Mr. Chairman, distinguished members of the subcommittee, this concludes my testimony. Thank you again for the opportunity to appear before you to discuss these issues. I will be pleased to respond to any questions you might have.

ATTACHMENTS:

BRIEFING SLIDES CITING JCS REQUIREMENT
FOR 51 TO 67 SSNS, INCLUDING
10 TO 12 BOATS WITH SEAWOLF-LEVEL STEALTH BY 2012

Attached are Navy briefing slides, except the slide entitled "Conclusions - Cost Related Factors," which is taken from the report of the Navy-appointed independent NSSN study group, also known as the Reynolds panel.

Investment Strategy

- **Goal**: Achieve the Joint Staff force level requirement of 51 to 67 SSNs
  - ➤ With 10 to 12 SSNs with SEAWOLF stealth by 2012

- **Integrated Plan-** ***A Balancing Act***
  - ➤ Inactivations- reduce force levels
    - – Accelerate force structure reductions
    - – Reduce resources required for modernization and operational support
  - ➤ Refuelings- sustain *near term* force levels
  - ➤ New Construction- ensure superiority for the future

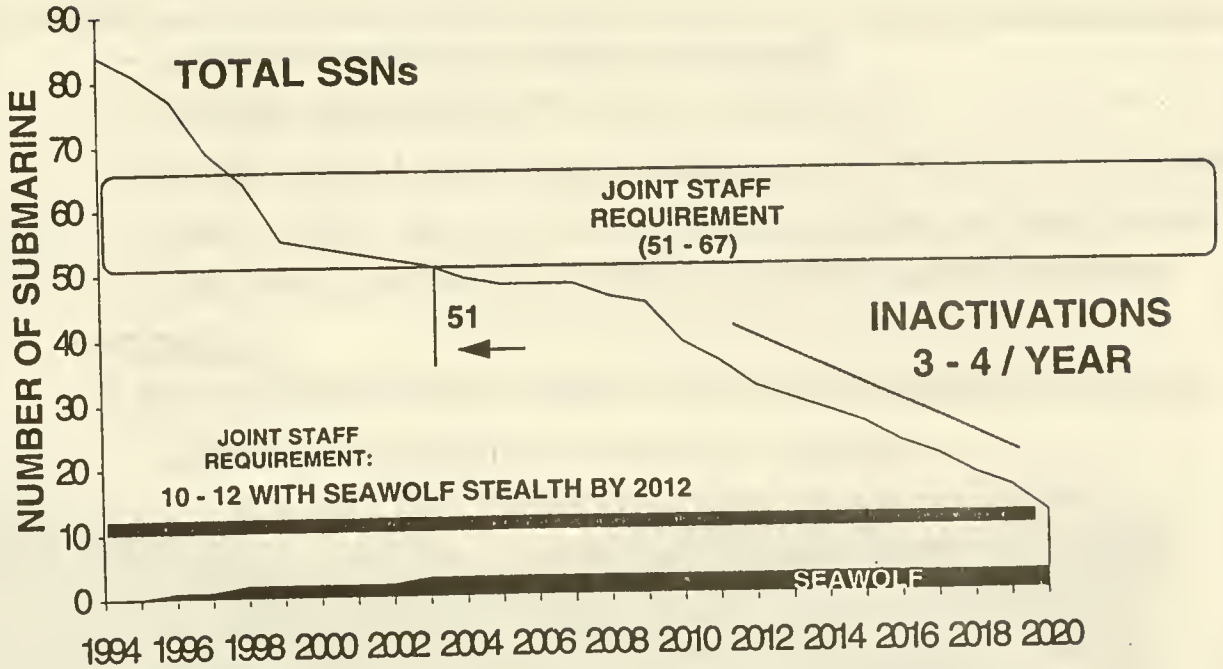
N87

Joint Staff Mandate

- *10 to 12 submarines* with SEAWOLF level of stealth *by 2012*
  - Capability = C (# of ships) + c (Individual Ship Capability)
    - "c" can not be compromised in submarines
    - Russians have always enjoyed numerical superiority
  - Quality counts
    - Russians build high performance advanced capability submarines

N87

SUBMARINE FORCE LEVELS: WITHOUT NSSN



SSN CONSTRUCTION REQUIRED

SLIDE 4

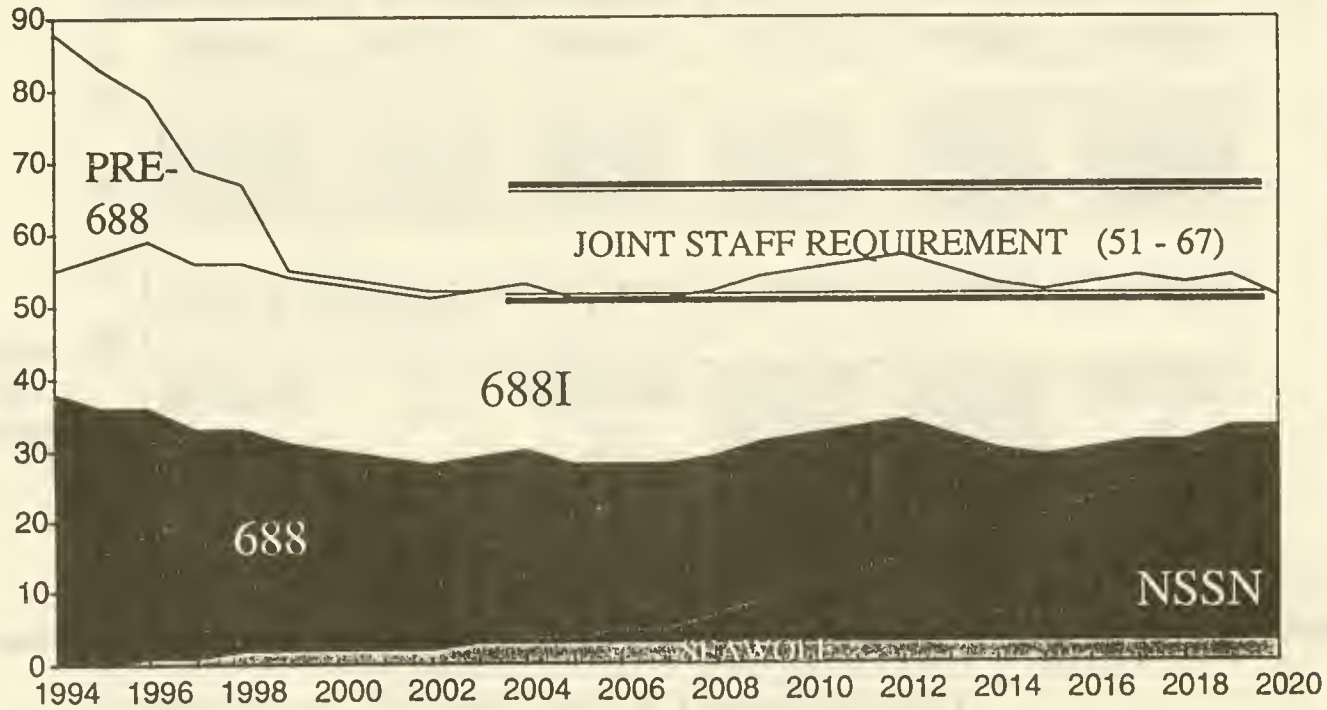
Conclusions - Cost Related Factors
Timing/Force Structure Observations

- *Draft RAND study (18 March 1994):*
  - *"Less than a billion dollar savings given longest gaps feasible"*
  - *"Further risks may jeopardize nuclear submarine program"*
  - *"Recommend continued submarine production"*
- ***FY98 Authorization** needed to maintain minimum force structure*
  - *One year delay removes decision maker's force level options*
  - *Delay makes "10-12 by 2012" Joint Staff objective unachievable*
- *Low rate NSSN production signals long term commitment*
  - *Provides stability during industry restructure*
  - *Preserves **submarine design capability***

Production Gap savings do <u>not</u> justify the risk
- FY98 NSSN recommended

INRG-17

Projected Force Levels



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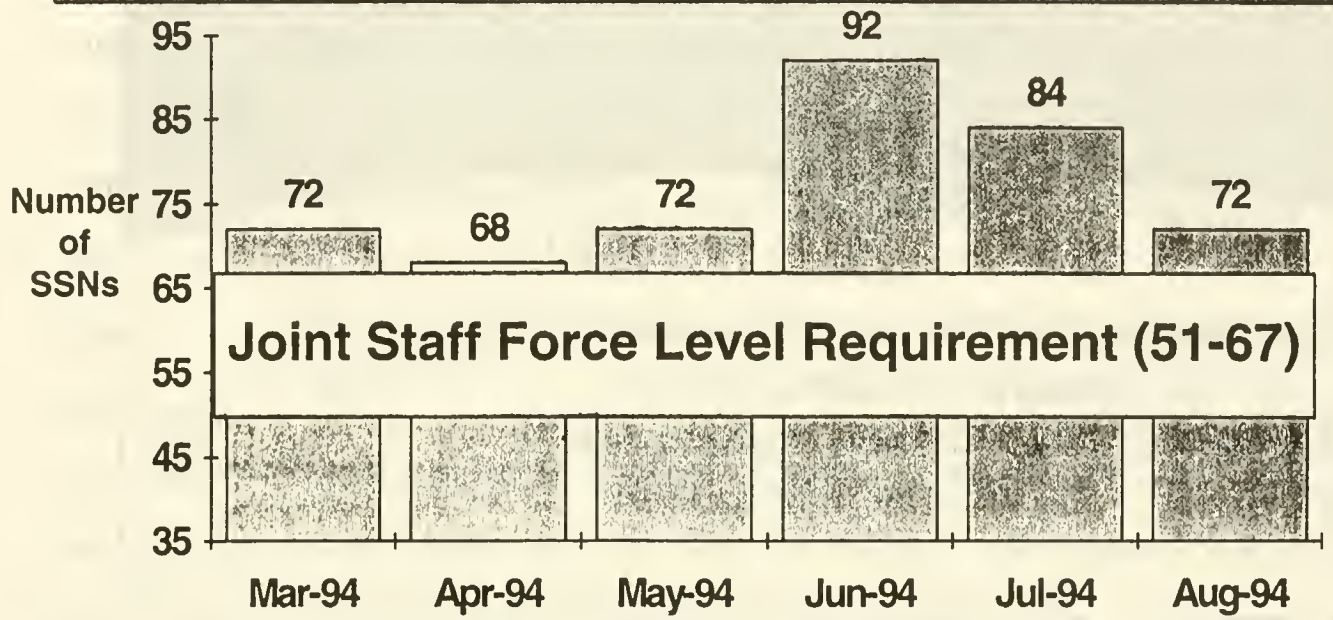
*Required Attack Submarine Force Levels Based on Present Day Commitments**



*Requirements determined from Actual Deployed Submarines multiplied by the Deployment Planning Factor

Projected Force Levels inadequate to meet present day Force Level Requirements

N87

SSN Force-Level Requirement -- Two Competing Statements

- Bottom-Up Review (BUR) (Sept. 93)
  - 45 to 55 SSNs
- JCS (1992; updated mid-93)
  - 51 to 67 SSNs
    - Including 10 to 12 with Seawolf-level stealth by 2012 (*not* 2010)

Requirements for SSNs

- SSNs -- not just for ASW
- non-Russian and Russian considerations

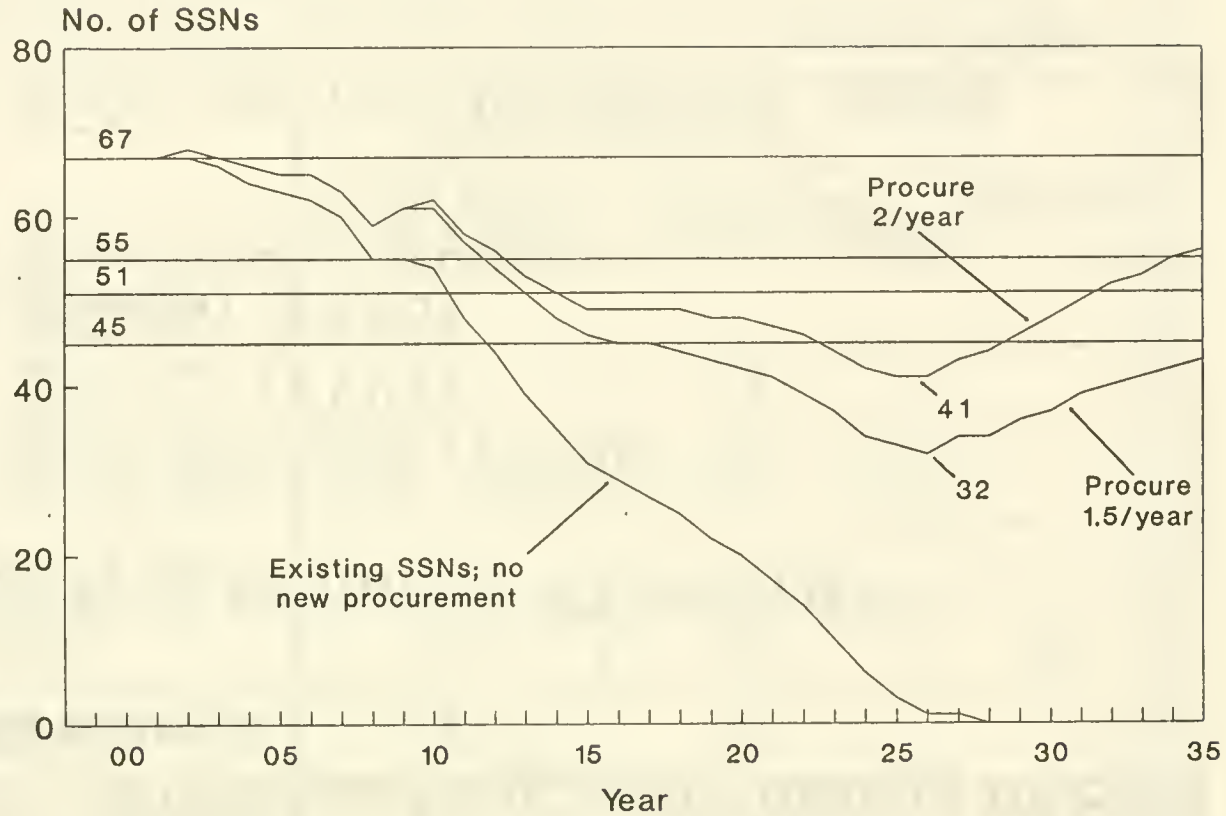
	non-Russian		Russian
	2 MRCs	presence	
Numbers			
up to 45	X	X	
more than 45		X	
Features			
flexibility	X	X	X
littoral ops	X	X	
Seawolf stealth			X

1990s -- a decade-long near-hiatus in SSN procurement

- 4 SSNs to be funded FY90-FY99
  - final SSN-688 (FY90)
  - SSN-22 (FY91)
  - SSN-23 (FY96)
  - first NSSN (FY98)
- 0.4 SSNs per year for 10-year period
- affects downstream procurement rates

SSN force levels

1998-2035, 30-year life



Source: Prepared by CRS, 3/95, based on U.S. Navy data.

Force levels and procurement rates

Force level	Rate to sustain through 2020s			
	30-year rate	After 90s near-hiatus	Extended hiatus	
			hiatus until	result-ing rate
45	1.5	2.05	FY02	2.4
51	1.7	2.35	FY00	2.45
55	1.8	2.55	FY00	2.65
67	2.2	3.15	FY97	2.8

SSN-23 -- not needed for 10 to 12 by 2012

- 2 Seawolf-stealthy boats -- SSN-21 and SSN-22 -- already funded
- 8 to 10 more needed in service by 2012
- 8 to 10 more funded by FY2006

NSSN procurement profiles

98	99	00	01	02	03	04	04	06	Tot
1	0	1	0	1	1	2	1	2	9
1	0	1	0	1	2	1	2	1	9
1	0	1	0	1	2	2	2	2	11

Key issue regarding SSN-23: 2 nuclear warship yards or 1?

	2 yards (split)	1 yard (consolidated)
Who does what	EB: subs NNS: CVNs	NNS: both
Main arguments	• optn for >3/yr • risk of accident	• NNS 4/yr? • economies of scope
FY96 funding	Fund constr. work for EB	Option to fund no work

If 2 yards -- 4 potential bridging options for EB

- Build SSN-23
- Build portion (back end) of SSN-23
- Build SSN-688 hull sections for backfit
- Build 1 or 2 688Is

- Only first option provides Seawolf-stealthy boat (though not necessary for JCS goal)

- Middle two options could be less expensive, but feasibility, cost-effectiveness not clear

NSSN vs. Seawolf, 688I -- Admin's view

	Afford-ability	Growth/ flexibility	Littoral ops	Seawolf stealth
688I	X			
Seawolf		partial		X
NSSN	X	X	X	X

- Affordability: share of SCN (~20% in past)
- 1.5 per year contingent on
  - increase in SCN to >$9 bil./yr
  - cost does not exceed $1.5 bil.
- 2 per year also contingent on >30% of SCN

Competition in procurement of NSSNs

- Dual-source when rate reaches 2 per year?
  - Feasibility, cost-effectiveness open to question due to low production rate
- Alternative: winner-take all competition for FY98 NSSN and all subsequent NSSNs
  - Leverage for government
  - 2 yards vs. 1 decided by competition
  - Ensuring level playing field

Mr. HUNTER. Mr. O'Rourke, keep your microphone on.

Let me just say to you that the service that you provide us in giving such a sterling presentation of this issue is greatly appreciated.

Let me say to my colleagues, while Mr. O'Rourke is at his board, we are going to ask Mr. Davis, Mr. Turner and Mr. Fricks to make their statements in a minute and Mr. Davis to give his briefing also.

If you have any questions with respect to the charts that he just went through, Members go right ahead and ask those questions.

Mr. KENNEDY. Mr. Chairman.

Mr. HUNTER. Yes, Mr. Kennedy.

Mr. KENNEDY. If we could go back to the beginning of your presentation.

Mr. HUNTER. We want to make these questions fairly brief for purposes of understanding.

Mr. KENNEDY. Very briefly. For purposes of understanding, we need to get to the new attack submarine class as quickly as possible to meet the new post-cold-war threat as you outlined in your first panel.

You were under the argument that what we could do was put off SSN because we may need SSN in the future. You talked about that when I think it has been acknowledged by those experts in the field that the SSN is a bridge.

We are not looking at it as something we are going to have to construct 3 years down the road because we are not going to be interested in constructing an SSN–23 because that was designed to meet the cold war threat.

It seems to me your logic falls apart at the outset when you say that we can hold SSN back, third SSN, this year and expect to move forward with it in another year. From that logic you deduce that you can do a one shipyard production as if SSN–23 was the goal toward producing this current third *Seawolf* which, as Secretary Slatkin said, is the bridge for the new attack submarine class.

Do you understand where I am coming.

Mr. HUNTER. Mr. O'Rourke, do you have that question?

Mr. KENNEDY. I think it goes to the heart of your argument.

Mr. O'ROURKE. I am not making an argument either in favor of or opposing procurement of a third attack submarine. There may have been some confusion in the way in which I presented the issue.

What I said is that SSN–23 is not necessary to be procured in fiscal year 1996 to meet the JCS goal of 10 to 12 *Seawolf*-level class submarines by 2012. That is an argument that Navy officials made before the authorizing committee on the other side a week ago in a Navy overview hearing.

I was trying to make the point that, in my view, that is in error. Nor am I making the argument that if you do not get it now we should be getting it later. Clearly, the reason to be building it now would be as a bridge to the new attack submarine. I do not believe that I presented the logic that I think you received from my presentation. I agree with you that logic would not hold. It is however not what was in my presentation.

Mr. HUNTER. Does anybody else have a question on the briefing we just had? Mr. Sisisky.

Mr. SISISKY. Thank you, Mr. Chairman. I think your last chart is probably the most important chart and that is winner take all. The important factor is to have a level playing field to do that.

I think you need to reiterate that again. If all of the engineering which have been cooperative on the 688–I's and the 688 were taken away from Newport News, that deletes the level playing field. Is that a fair assumption?

Mr. O'ROURKE. As I mentioned toward the conclusion of my presentation, several steps would have to be taken in all probably to ensure a level playing field. One of those steps would be to make sure that Newport News had an understanding of the design of this boat that was equal to Electric Boat's.

Under the current arrangement where the Navy has singled up and is working closely with Electric Boat in the design process for the new attack submarine, it may be putting Newport News in a more marginal position in terms of understanding what that design is.

If you do not understand the design as well as your competitor does, that would be a disadvantage in a competition of this kind. As you mentioned, the stakes in such a competition would be enormous.

Mr. SISISKY. Of course, it is just more than engineering. It is also repair of submarines to keep a force in effect. Reconstitution works both ways in both of those yards which hopefully we will explore a little later. Thank you.

Mr. HUNTER. Mr. O'Rourke, one question on that to follow-up on Mr. Sisisky. You said that there is an inherent advantage in modeling a design to be compatible with construction processes for a given yard. That would have to be pulled out of the design to render the playing field level in a competition.

Mr. O'ROURKE. Arguably, that would be the case. The Navy and the administration having decided that they would like the boat to be built at Electric Boat has made the rational decision to single up with that yard and to work hand in glove with them to optimize the design for the particular production processes and methods at Electric Boat.

Mr. HUNTER. That process carries cost deficiencies; does it not?

Mr. O'ROURKE. That is right. It is quite rational for the Navy and the Administration to make that choice if they had previously decided, as they have that they would prefer to have that boat built at Electric Boat.

If you in fact wanted to have a level playing field for building this boat, you would have to return to a situation where the design was not optimized for the particular production processes of either yard. The process of pulling those features out of the design of new attack submarine is probably going to entail time and cost.

Mr. HUNTER. You are saying that you are actually pulling cost reducing factors out of the design.

Mr. O'ROURKE. That is exactly right. The design you wind up with under the scenario would not be optimized for the production process of either yard. It would not be produced as inexpensively as either yard could under those optimized conditions. That is a

part of the price for leveling the playing field to hold such a competition.

The other price would be that the cost to back those features out means that you have to pay engineers to back those features out and make them generic. That is money. Because they have to spend their time to do that, you could in fact wind up delaying the program by some amount of time to a fiscal 1999 start or even possibly later.

Mr. HUNTER. Thank you.

Any other questions for Mr. O'Rourke before we move to Mr. Davis?

Mr. HUNTER. Yes, the gentleman from Virginia.

Mr. BATEMAN. Thank you, Mr. Chairman.

Obviously, if you undertake to assure a certain result in the design of something and assume production at one place, you can certainly affect the cost of the production.

The thing that seems to me that is left out of the equation, and perhaps needs some discussion, is let's look at the fundamental decision or premise, let's do it here, if there was, at the time that decision was made, another alternative that was extraordinarily less costly to the government.

Taking everything you have said about its being designed to suit production at a certain place and it might cost something to rearrange that design, we still have not addressed the differences in overhead, the differences and historical experience as to who is the low cost builder and where the economies to the taxpayer ultimately lie. I think those are very much a part of the equation. Are they not?

Mr. O'ROURKE. I would agree. It does go to the prior question of what kind of industrial arrangement we want to have in the future for the production of nuclear powered warships.

The Navy and the administration has chosen the preference for the split arrangement. The main alternative to that is the consolidated arrangement.

One of the main arguments in favor of the consolidation situation made by its advocates has to do with the potential for economies of scope in the production of these ships, if you consolidated at one site.

Those in turn focus on the ability to have those ships bear the fixed cost of only one nuclear certified yard rather than two.

Mr. BATEMAN. I get lost more quickly than I should on technical engineering considerations. I find great appeal in the words on there "winner," "competition" as being the basis on which these judgments should be made rather than a governmental farad that elects or selects a winner and a loser, without regard to what the ultimate cost to the taxpayers of America and the needs of the national security would be.

There just is a philosophical predilection, at least on my part, that competition should be what governs, not a governmental farad; we have picked this winner instead of you. You loose.

Mr. O'ROURKE. You are absolutely right. The policy makers face a choice as to whether they want to use competition to decide who builds how many of these boats or who builds all of them, or whether to instead us a decision process that involves a deliberate

decision to go one way or the other without using competition. That is a choice for policy makers.

Mr. BATEMAN. In order to have such a competition, certain things would have to be done as relates to either of the two builders. I would assume that as to Electric Boat, to be in a position to compete for the new attack submarine, they would have to have an SSN–23, the bridge, for them to remain in submarine production, since that is all they do is submarines.

Mr. O'ROURKE. For them to be a healthy competitor for a boat to be built in fiscal year 1998, SSN–23 or some other kind of submarine construction work would probably have to be funded in fiscal year 1996 for Electric Boat.

Mr. BATEMAN. In order for Newport News to be in a position to be competitive at the outset of the New Attack Submarine Construction Program certain things would have to be done there, i.e., keeping in the engineering and design loop, continuing to do certain nuclear overhauls and refueling of submarines and of nuclear powered aircraft carriers.

Mr. O'ROURKE. That's right. Steps would have to be taken to make sure that Newport News was a healthy competitor.

Mr. BATEMAN. If each step was taken as to each builder, would that protect the ability to then have a fair, level field competition for building all of the nuclear attack submarines we can foresee being needed or affordable?

Mr. O'ROURKE. These are the kinds of steps that you would contemplate taking in an attempt to make the playing field as level as possible. Whether they would be sufficient, whether there would still be a need for other steps is something that would have to be more fully discussed, but those are the steps that occurred to me as I began to work my way through the analysis in which I thought I should share with the committee.

Mr. BATEMAN. Thank you.

Mr. HUNTER. I thank the gentleman. Ms. DeLauro and then a very quick follow-up, Mr. Kennedy and we will move to our next witness.

STATEMENT OF HON. ROSA L. DELAURO, A REPRESENTATIVE FROM CONNECTICUT

Ms. DELAURO. Thank you, Mr. Chairman.

Mr. O'Rourke, your presentation appeared to focus primarily on the number of submarines that we need in 2010 or 2020. It would seem to me that the critical issue that we face now is what our current capability is, given what is going on with the current threat and with the Russians.

As I understand it, the Russians are reconstituting their submarine forces to the exclusion of most other strategic programs and conventional forces. That they have resumed submarine exercises at sea. That their stealth capability has increased.

It seems to me that in terms of your presentation that rather than the numbers that need to get built, the capability in the short term is what is critical. To have a delay in dealing with that capability while trying to ensure a level playing field in essence puts the United States at a disadvantage vis-a-vis the Russians and moving forward.

The other piece of this, and I don't know if it is configured in any of your comments here, is that ability to produce, what is required to produce, the submarine; the capability which already in fact exist.

It takes years to develop that capability or to be able to do it. The skills that produce a submarine take years to acquire and, in my view, would be lost if production lapses, which then deals with the issue of short-term capability and where we need to go which, I make a presumption, is where the administration's decision on dealing in the way that they have now with the third *Seawolf,* with Electric Boat and moving on to the new attack submarine.

What is your view in terms of our immediate capability and the delay that you are talking about in getting to that level playing field?

Mr. O'ROURKE. You are absolutely right.

The issue is not just one of numbers, but of the characteristics that we have built into our individual attack submarines. One of my earlier charts discussed the difference between requirements for numbers and requirements for the kinds of features we would like to have in our submarines.

That is a nearer term issue. We would like to have, as the administration and the Navy views it, attack submarines that have features for littoral operation. Those kinds of features are not currently resident all that much in our current attack submarines.

The Navy further believes that we need to have submarines in the nearer term, not just in the longer term that have *Seawolf*-level stealth. That is to counter, as you mentioned, the fact that although Russian submarine production has abated numerically, has not ceased.

In fact, the technological competition between the two countries in submarine production and development has not abated at all. What you are bringing up is the fact that it is not numbers, but features as well.

Features is a short term issue as well as a long run. It includes considerations that are both non-Russian oriented and Russian oriented. The issue as you mentioned is, what are the consequences for meeting these nearer term objectives if we make decisions that have the byproduct of delaying the production of submarines.

That is what the committee and the Congress as a whole needs to address. Under some scenarios, you could run into a situation where decisions you make will delay production of the new attack submarine which would meet both of these goals.

Ms. DELAURO. This could potentially put us at a risk.

Mr. O'ROURKE. If you believe in the JCS goal and if you believe in the importance of incorporating littoral features into your submarines, then you would probably conclude, that is putting us at risk. That is an undesirable policy.

The question is, what path can you choose that best allows you to meet these goals without a delay?

Ms. DELAURO. Just one question, Mr. Chairman, thank you.

Does your presentation include the skill level that is needed to produce what we have and the delay in terms of transferring skill level?

Mr. O'ROURKE. Right. As I mentioned earlier, if you were to take steps to level the playing field, you would run into a situation where you might delay the start of the New Attack Submarine Program. As for the skills, we have two yards right now which are both fully capable submarine design and construction facilities. One of those yards focuses only on submarines. It needs an industrial base bridge to sustain it out to the advent of the New Attack Submarine Program.

The other yards happens to have a broader business base. It involves the construction of the nuclear carriers and other surface ships. It has previously testified that it would not need any interim submarine construction work to maintain its ability to restart production in fiscal year 1998, on the same schedule, as long as two conditions are met.

The first being construction of the aircraft carrier, CVN–76, which was funded last year. The other being the provision of submarine overall and repair work to that yard that would normally go to the naval shipyards.

Ms. DELAURO. Thank you.

PREPARED STATEMENT OF HON. ROSA L. DELAURO, A REPRESENTATIVE FROM CONNECTICUT

Mr. Chairman, I want to thank you for holding this hearing today on the critical subject of our nation's attack submarine force. I also want to thank our witnesses for being here, and I especially want to welcome *Mr. James Turner, CEO of General Dynamics Electric Boat Division.* We're proud of the contributions that you and the highly skilled workers of Electric Boat in Connecticut make to our national security.

Mr. Chairman, I make no bones about the fact that I am a strong supporter of building the third Seawolf and the New Attack Submarine.

Much of the debate has focused on the Navy's contention that building these submarines is vital to preserving our submarine industrial base and to maintaining two nuclear-capable shipyards. I believe this is strong enough justification for the Navy's budget request, given the fragile state of the submarine industrial base today and the prohibitive cost of reestablishing a submarine manufacturing facility in the future.

But in my view, Mr. Chairman, an even stronger argument for building the Seawolf and the New Attack Submarine is the national security requirement *today.* I was quite alarmed on *February 22* when Admiral Boorda testified before the full National Security Committee that Russia today has six submarines *quieter than our 668I-class attack* submarine and will have an additional six by 2010. As Admiral Boorda stated, "We *should have subs at sea that are quieter than them.*"

I was also alarmed by an article in the February 6 edition of *Defense News* that stated, "Despite enormous economic difficulties, the Russian government continues to invest in submarines and is expected to field a more advanced sub force by 2000."

These developments say to me that we must do all we can to preserve and enhance the *knowledge bases* and *cutting-edge skills* of our *submarine production* team. We must not make short-sighted decision that put our technological edge at risk. And we cannot afford any delays in building stealthier, more capable submarines that we need to counter the advances of the Russian force. We must move forward with the third Seawolf and the New Attack Submarine.

Mr. Chairman, before I pose some questions to our panelists, I would like to request unanimous consent to submit *for the record a letter and a newspaper editorial from our colleague, Congressman Jack Reed of Rhode Island, as well as a research brief by the Rand Corporation about U.S. attack submarine production.*

Mr. HUNTER. Thank you.

One last question before Mr. O'Rourke leaves his boards; Mr. Kennedy for a quick one.

Mr. KENNEDY. Thank you.

I really feel that we are talking apples and oranges here because we are hearing one side, the military case. We can argue about

that. I think the testimony that you have given so far, as a CRS testimony, and talking about philosophically are we going to have cost savings on a consolidated yard, or are we going to have two yards and where can we squeeze out the costs?

Essentially, this is where I feel the debate so far on this panel has gotten. What I fail to hear and what you have said in your opening statement is that, "A full cost effectiveness has not been explored."

I take those direct quotes from your statement, "A full cost effectiveness." So, while we hear philosophy, well, if you consolidate you obviously consolidate fixed costs and maybe there will be savings there, you readily acknowledge that there are added expenses to one yard because of the capability that you give up when you delay.

As Ms. Slatkin said, it is going to cost us a billion dollars if we don't move into the production of the SSN–23, third submarine, in Groton. What I feel is very disconcerting for all of us as policy makers is that we are given this, excuse my explanation of this, this "mumbo-jumbo" about philosophy and various scenarios when talking in this scenario kind of concept doesn't do us any good unless we have the numbers.

I am happy along with colleagues from Virginia to discuss this based upon the facts. All I want are the facts. I want to know how much it is going to cost to go to a unified yard, if that is what some policy makers think. I want to know how much it is going to cost to keep both yards going. If I get the facts, then I can make that judgment. I think that is where we can come to some agreement here.

What I was disturbed by, by your testimony, as we were talking about JSC numbers and this and that, it is a lot of different numbers here and requirements. I feel we lost the real issue and that is getting about meeting our national security requirements and doing so cost effectively.

I think that we have mixed the two in the course of this presentation because of what I have just said. We haven't gotten the real cost benefit analysis of a one yard versus two yard scenario because that is what I feel this debate has gotten down to.

Mr. HUNTER. If the gentleman will wait a little bit, we are going to have a couple of people from industry to give us some numbers and give us some cost savings projections, at least from their points of view.

Mr. O'Rourke, you have given us a tremendous briefing on the considerations that we have to make before we can arrive at this decision. Thanks for attending. You brought in some good questions and some tough questions. Now, if you could remain available for back at the panel.

I want to call on Mr. Richard Davis, Director, National Security Analysis, U.S. General Accounting Office.

Mr. Davis, welcome. We look forward to your remarks.

STATEMENT OF RICHARD DAVIS, DIRECTOR, GENERAL ACCOUNTING OFFICE, NATIONAL SECURITY ANALYSIS, NATIONAL SECURITY AND INTERNATIONAL AFFAIRS DIVISION

Mr. DAVIS. Thank you, Mr. Chairman.

I would just like to have my prepared statement submitted for the record.

Mr. HUNTER. Without objection, absolutely.

Mr. DAVIS. I would like to just summarize a couple of my main points and then offer a few other comments.

First, there are less costly alternatives than the approach that the Navy has chosen to maintain the required submarine force structure. As recently reported, these alternative approaches would save billions of dollars and meet the Navy's force structure and threat requirements.

Second, the SSN–23 is not needed to satisfy force structure requirements or to counter the threat. Instead, the Department of Defense's justification for building the submarine is to preserve competition and to meet industrial base and national security needs.

We believe Department of Defense's [DOD] justification is inadequate as a basis for building the SSN–23 because there currently is no competition to build nuclear attack submarines. DOD has not made clear what it means by long-term industrial base and national security needs.

I would like to offer a few comments in three major topics: Force structure, modernization, and threat, and industrial base. Prior to reaching this decision that the bottom-up review made that the attack submarine force structure would be between 45 and 55, it reviewed a number of options. One option it reviewed was a 55 force. They concluded that with a 55 submarine force, they could meet all of their wartime requirements as well as peacetime requirements.

They also reviewed a 45 submarine force. They concluded with that force they could also meet all of their wartime requirements, but it imposes a greater degree of risk to peacetime operations than the 55 force. They subsequently agreed on a 45 to 55 force option.

In order to get to the bottom-up review level of 45 to 55, between now and 1999, the Navy is going to be inactivating a lot of submarines. They have roughly about 85 today. They are going to be getting down to the 55 structure or number by 1999.

The Navy's plan is to build 31 submarines between 1996 and 2014 at a cost of $48 billion. If you look at the chart over there, you can see the two lines that represent the force structure, 45 to 55. The solid line up top is the number of submarines that the Navy will have in its inventory, by year, from not through 2020.

What is shows is that it roughly will have about 55 each year. Aware that the Navy was concerned about the affordability of its future weapons procurement, we wanted to see if there were less costly alternatives. We looked at three different alternatives maintain a sustained low rate production.

A third alternative we looked at, third production, broke the production base, if you will. The first alternative we looked at basically mirrored the Navy's approach in most respects. The principal difference was that the alternative would build only 25 submarines versus 31 as the Navy had projected.

This rate of production would also sustain a low rate. It required six fewer submarines. Therefore, it allowed the opportunity to save about $9 billion which is six submarines times about a $1.5 billion cost per submarines.

You can see from the chart again, the dotted line represents where that alternative is compared to the Navy's alternative. You can see that for about the next 20 years, to about the year 2013, that alternative is almost identical to the Navy's. Then about the year 2013 it starts moving toward the 45 number, which is where it reaches in the year 2020.

Another alternative that we looked at would extend the life of nine refueled 688 submarines. This is possible because when the Navy built the 688 submarines, basically they had a first batch of 31 and then there was a second batch. There are different nuclear coolers in those.

The first batch of the 688's has a design life of 30 years. When it reaches about its midway point, they have to refuel it because the original core wears out. The second batch has a much longer service life. It would allow it to operate for longer numbers of years. If when nine of these 688's reached their midpoint at the refueling, they would install the newer core into those nine submarines. Then we are allowed to let them operate for a longer period of time beyond the design life.

They could also reduce the number of submarines they have to buy. We would projects that they would only have to buy 17 submarines between now and 2014 if they did that. Stretching the design life of a submarine is not an unprecedented move. The Navy has done that before in earlier class submarines.

Also, they are studying the responsibility of doing that today on the SSBN's which currently has a design life of 30 years. They are looking at extending it as long as 40 years. The second alternative is that you would have to buy 14 fewer submarines. You would save about $17 billion after accounting for the overhaul costs that would have to take place on the nine submarines.

The third alternative we looked actually broke production. In fact, the Secretary of Defense last year testified that DOD has no force structure need to build submarines until after the turn of the century. This is because the inventory of submarines that the Navy has would still meet the 45 to 55 requirement as far as 2012.

The advantage of a deferral is that it freezes up billions in the near term. To illustrate this, we analyzed an alternative in which construction would be deferred until the year 2003. We made certain assumptions. We assumed that at that point in time it would take 5 years to build submarines.

However, we also assumed that this first submarine would be take 7 years and a second submarine would take 6 years. We did that because we know that it would require longer periods of time. In fact, in a recently completed Rand Report, they concluded that the first submarine after a hiatus would only take 6 years to build if it was done at Newport News, given that the CVN–76 was funded, which occurred last year.

This alternative would save $9 billion in procurement costs because of the fewer submarines that would have to be built. It would defer as much as $9 billion in new construction between the years 1996 and 2002.

These three alternatives demonstrate that the Navy can maintain its approved force levels by acquiring fewer than 31 SSNs through 2014 as currently planned. Furthermore, if the Navy de-

fers construction to 2003, it would not build a third *Seawolf* in 1996.

The Navy could still achieve its approved force levels without building the third *Seawolf* if it chose either one of the first two alternatives that I proposed by either consolidating submarine construction at Newport News or finding another way to bridge the production gap at Electric Boat.

Let me just turn—I have a few comments on the modernization and threat issue. As you heard already today, the Navy does want to have an inventory of about 10 to 12 *Seawolf* quiet submarines by the year 2012.

In the first two alternatives, plus the Navy's own plant they can achieve that. They can achieve it even without building the *Seawolf*. In the deferral plan, the third alternative that I discussed with you, that cannot be achieved until the year 2014.

I would like to offer a few comments about the recent Office of Naval Intelligence Report, "Worldwide Submarine Proliferation in the Coming Decade." According to the report, Russia's front line submarines are for the first time as quiet or quieter, in some respects, than the SSN–688I's. Russia plans to continue reducing radiated noise on its submarines.

However, the report does not address other factors that should be considered to determine the overall superiority of United States and Russian submarines, such as sensor processing, weapons, platform design, tactics, doctrine, and training. This omission is significant since, according to the Navy, it is essential that these factors be considered in addition to acoustic quieting to determine the overall qualitative advantage of United States versus Russian submarines.

A number of reports note the decline in Russian submarines operating TEMPO's, order of battle and construction programs. They also note that morale and discipline has deteriorated. Personnel shortages are serious and the frequency and scope of naval operations, training, readiness and maintenance have declined.

It is also important to note that the intelligence community disagrees about the course of the future Russian submarine threat. For example, based on our preliminary work we are aware of differences within the community concerning such issues as Russia's defense spending priorities, Russia's ability to maintain its production schedules and future threats in areas.

Mr. HUNTER. Mr. Davis, thank you. Let me offer, because we have members who have to catch planes and we are at the end of a work week, we are very rushed for time. I understand your testimony with respect to the Soviet threat is very valuable.

If you could submit that for the record, we would appreciate it. What we need to do at this point is probably move into the question at hand with respect to the 2 yards. We really appreciate your testimony this morning or this afternoon. We will take your entire statement for the record.

If there are any concluding remarks you would like to make, please do. We need to move ahead.

Mr. DAVIS. I just have a few things I would like to say.

Mr. HUNTER. Go ahead.

Mr. DAVIS. DOD decided to build the SSN–23 in 1996 and commence with new SSN construction in 1998 at Electric Boat to support the nuclear shipbuilding industrial base. In its bottom-up review, DOD considered several options to avoid the potential consequences of a gap in submarine construction. A key option considered was the consolidation of all carrier and submarine construction at one shipyard.

DOD reported that under this option, $1.2 billion would be saved after accounting for about $625 million in shutdown and reconstitution costs. DOD rejected this option because of its concern about the resulting loss of competition and other long-term defense industrial base and national security needs.

In April we testified before that DOD had not provided the basis for its position. It was not clear what DOD meant by meant by loss of competition. For example, only one shipyard currently builds nuclear aircraft carriers, but DOD has not expressed concern about the lack of competition in that program.

Moreover, DOD has directed future nuclear submarine work to be done at the other nuclear capable shipyard virtually eliminating competition. It is not clear why DOD determined that two nuclear capable yards are needed to protect the long-term defense industrial base and national security needs.

Mr. HUNTER. OK.

Mr. DAVIS. Mr. Chairman, that concludes my comments.

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NAVY SHIPBUILDING PROGRAMS

Nuclear Attack Submarine Requirements

Statement of
Richard Davis, Director
National Security Analysis, National Security and
International Affairs Division

Before the Subcommittee on Military Procurement,
Committee on National Security, House of Representatives

GAO/T-NSIAD-95-120

Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to be here today to discuss the requirements for continued production of nuclear attack submarines. I will summarize our two main points on this issue and then discuss the specifics.

-- First, there are less costly alternatives than the approach the Navy has chosen to maintain the required SSN force structure. As recently reported, these alternative approaches would save billions of dollars and meet the Navy's force structure and threat requirements.[1]

-- Second, the SSN-23 is not needed to satisfy force structure requirements or to counter a threat. Instead, the Department of Defense (DOD) justification for building the submarine is to preserve competition and to meet industrial base and national security needs. We believe DOD's justification is inadequate as a basis for building the SSN-23 because there currently is no competition to build nuclear attack submarines and DOD has not made clear what it means by long- term industrial base and national security needs.

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[1]Attack Submarines: Alternatives for a More Affordable SSN Force Structure (GAO/NSIAD-95-16, Oct. 13, 1994).

BACKGROUND

In October 1993, DOD issued its bottom-up review--an assessment of U.S. defense needs in the post-Cold War security environment. According to the report, the threat that dictated the U.S. defense strategy, doctrine, force structure, weapons, and defense budgets is gone.

As for the Navy's attack submarines, the review decided that (1) a force of 45 to 55 would be needed to meet the requirements of the U.S. defense strategy, for both regional conflicts and peacetime presence operations; (2) Electric Boat Shipyard in Groton, Connecticut, would build the third Seawolf submarine (SSN-23) to bridge the projected gap in submarine production; and (3) the Navy should develop and build a new, more cost-effective attack submarine than the Seawolf, beginning in fiscal year 1998 or 1999, at the Electric Boat Shipyard. DOD believed that with this approach, it would maintain two nuclear-capable shipyards and mitigate the risk to the industrial base.

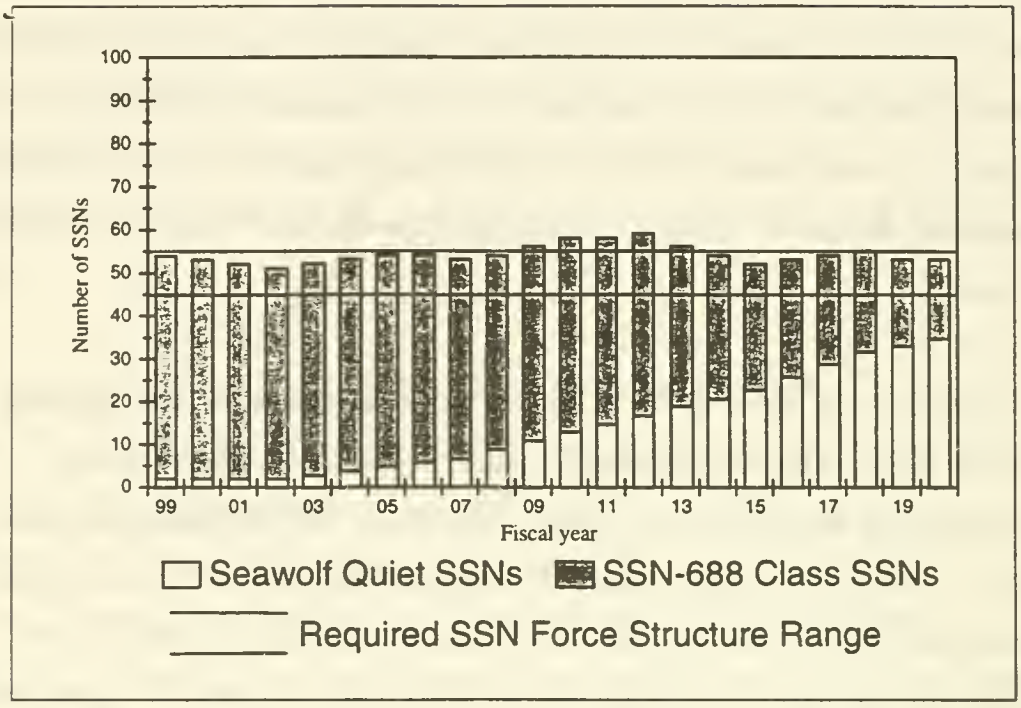
DOD's report on its bottom-up review states that before it decided on a force of 45 to 55 attack submarines, detailed analyses of various options were performed by the Joint Staff,

the Navy, and the Office of the Secretary of Defense. The analyses of a 55 submarine force indicate that it would meet all wartime requirements for regional conflicts, as well as fulfill peacetime needs. The analyses of a 45 submarine force indicate that it could also fulfill wartime requirements, but it imposes a greater degree of risk to peacetime operations than a 55 SSN force.

To reduce its SSN force of about 85 submarines to the maximum of 55 by 1999, the Navy plans to retire its pre-SSN-688 class submarines and 10 of its older SSN-688s, while taking delivery of the 7 SSN-688Is and 2 Seawolf class submarines currently under construction. The 10 SSN-688s will be retired at about the midpoint of their 30-year design life, or the time a refueling overhaul would be required; therefore, each of these submarines will have as much as 14 years of their design service life remaining. The Navy believes that retiring the SSN-688s prior to their mid-life refueling is the lowest cost means of reducing the SSN force.

To maintain an SSN force of 45 to 55 submarines, the Navy plans to begin building 31 SSNs between 1996 and 2014 at an estimated procurement cost of $48 billion. This approach allows the Navy to maintain an SSN force structure close to the maximum of 55 SSNs through 2020 (see Figure 1).

Figure 1: Effects of Navy's SSN Shipbuilding plan on SSN Force Levels (1999-2020)



ALTERNATIVES TO THE NAVY'S SHIPBUILDING PLAN ARE LESS COSTLY AND MEET DOD'S NEEDS

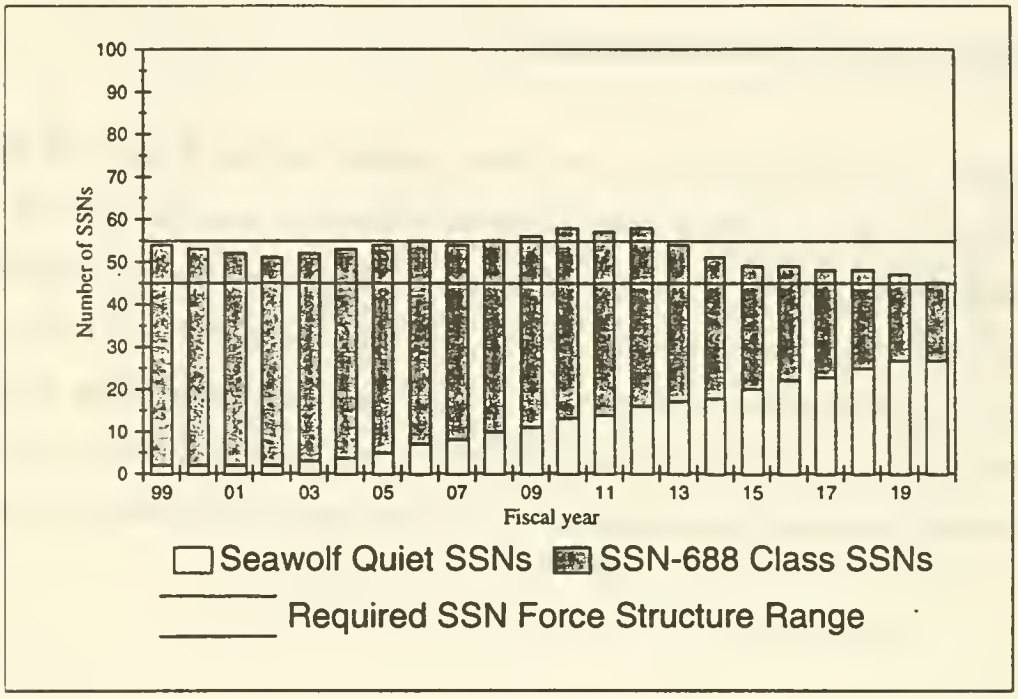
In October 1994, we reported that there were less costly alternatives to the Navy's shipbuilding plan for maintaining DOD's approved attack submarine force structure of 45 to 55 submarines. Under two of the three alternatives we discussed, the Navy could maintain a sustained low-rate production, and under the third, the Navy could defer SSN construction until

early in the next century.

Acquire Fewer Attack Submarines

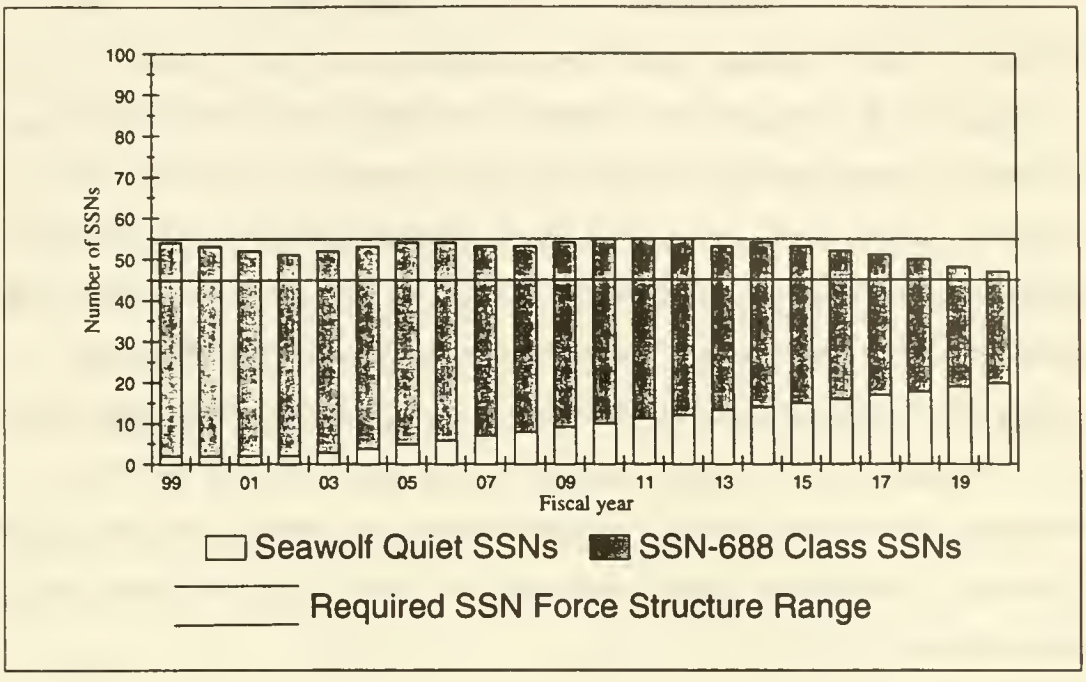
Under one alternative, if the Navy begins to build only 25 SSNs through 2014--6 fewer than planned--it could save $9 billion in procurement costs. It could also maintain close to 55 submarines through 2013, before declining to 45 SSNs in 2020 (see figure 2). This alternative would never require funds for more than two SSNs per year through 2014. Beyond 2014, this alternative would require managed procurement of no more than three SSNs per year.

Figure 2: SSN Force Level Projections Through 2020 if the Navy Buys 25 SSNs Through 2014 (1999-2020)



Under a second alternative, the Navy could extend the service life of 9 refueled SSN-688s and buy 14 fewer submarines than currently planned. This approach saves $9 billion in procurement costs and defers an additional $8 billion. This alternative also allows the Navy to maintain a force structure of 45 to 55 submarines (see figure 3).

Figure 3: Effects on SSN Force Levels of Extending the Service Life of Nine Refueled SSN-688s (1999-2020)



The nine refueled SSN-688s will receive nuclear cores of the same design as those installed in newer SSN-688s. With these new nuclear cores, the nine submarines will have sufficient fuel to operate for an additional 120-month operating cycle at the end of their 30-year design life. Furthermore, officials from both SSN shipbuilders stated that SSN-688 class submarines could operate for much longer than 30 years; one of the shipbuilders stated that 10 to 20 years of additional service would not be unreasonable.

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Past Navy actions indicate that extending a submarine's service life may be feasible. After a 5-year study was completed on the SSN-637--the predecessor of the SSN-688--the design life was extended from 20 years to 30 years, with a possible extension to 33 years on a case-by-case basis.[2] According to Navy officials, a similar study could be the basis for extending the SSN-688's service life. Navy officials said, however, that (1) it would be premature to begin a study before 1998 at the earliest, when the SSN-688s near the end of their design life, and (2) the Navy plans no such study of the SSN-688. The Navy has begun to study an extension from 30 to 40 years of the service life of its Nuclear-Powered Ballistic Missile Submarine (SSBN)-726 Ohio class (Trident) submarine, which entered the fleet 5 years later than the SSN-688.

Defer Attack Submarine Construction

Under a third alternative, the Navy could defer new SSN construction. In February 1994, the Secretary of Defense testified that DOD has no force structure need to build new submarines until after the turn of the century. New SSN construction can be deferred because the Navy can maintain the minimum 45 SSN force structure with its current fleet until 2012.

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[2]In 1989 the Navy accelerated the retirement of the SSN-637 class so that most will be retired by 27 years of service.

A deferral of new construction can free up billions of dollars in planned construction costs in the near term. As an illustration of the potential for deferring SSN construction, we analyzed an alternative in which construction is deferred until 2003. We assumed that construction of the submarines would take 5 years, which is how long the Navy estimates new attack submarine construction will take. However, we lengthened construction time for the first two SSNs to 7 and 6 years, respectively, to account for the additional time needed to build the first submarine of a class and any extra effort required to restart production after a hiatus. We believe that using 7 and 6 years is reasonable because RAND recently reported[3] that 6 years would be required to deliver the first submarine after restarting submarine production at Newport News Shipbuilding, assuming construction of the funded aircraft carrier, CVN-76. Although SSN unit costs would vary based on the number of SSNs bought, we used the same procurement costs as the Navy's current estimates for the new attack submarine program.

Compared to the Navy's September 1993 SSN shipbuilding plan, this alternative would save about $9 billion in procurement costs through 2014. Also, this alternative defers as much as $9

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[3]The U.S. Submarine Production Base: An Analysis of Cost, Schedule, and Risk for Selected Force Structures, RAND (Santa Monica, CA., 1994).

billion in planned SSN construction funding from 1996 to 2002, some of which would be offset by reconstitution costs.

The 1994 RAND report, which evaluated the U.S. submarine production base, shows that reconstitution costs are highly dependent on assumptions regarding closing, maintaining, and restarting shipbuilder facilities; hiring and retraining personnel; and shipbuilder workloads. According to the report, shipbuilder facilities and personnel reconstitution costs are estimated at $800 million to $2.7 billion.[4] The $800 million estimate is based on the Navy's beginning to build CVN-76 at Newport News Shipbuilding in 1995 and then restarting submarine production in 2003. The $2.7 billion represents RAND's estimate to restart submarine production at Electric Boat in 2003. Further, Navy officials cited a Navy industrial base study estimate of $4 billion to $6 billion for reconstitution costs, including vendor costs. Figure 4 shows the force structure implications of deferring SSN construction to 2003.

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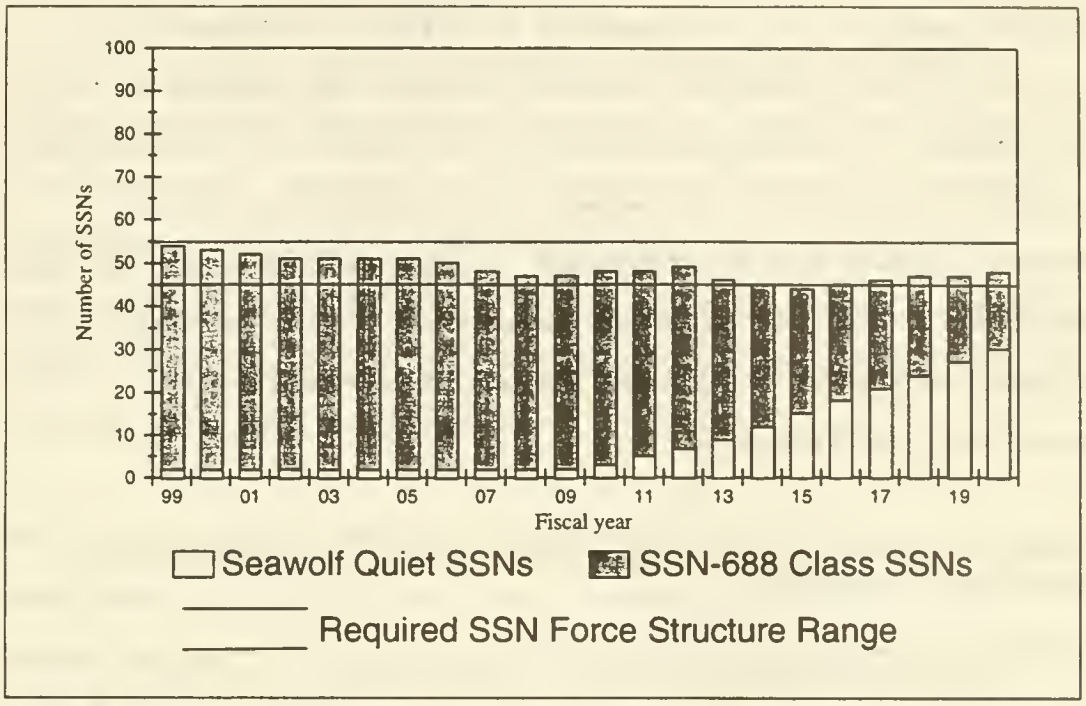
[4]The RAND report used fiscal year 1992 dollars.

Figure 4: SSN Force Structure Under a Deferred Acquisition Scenario (1999-2020)

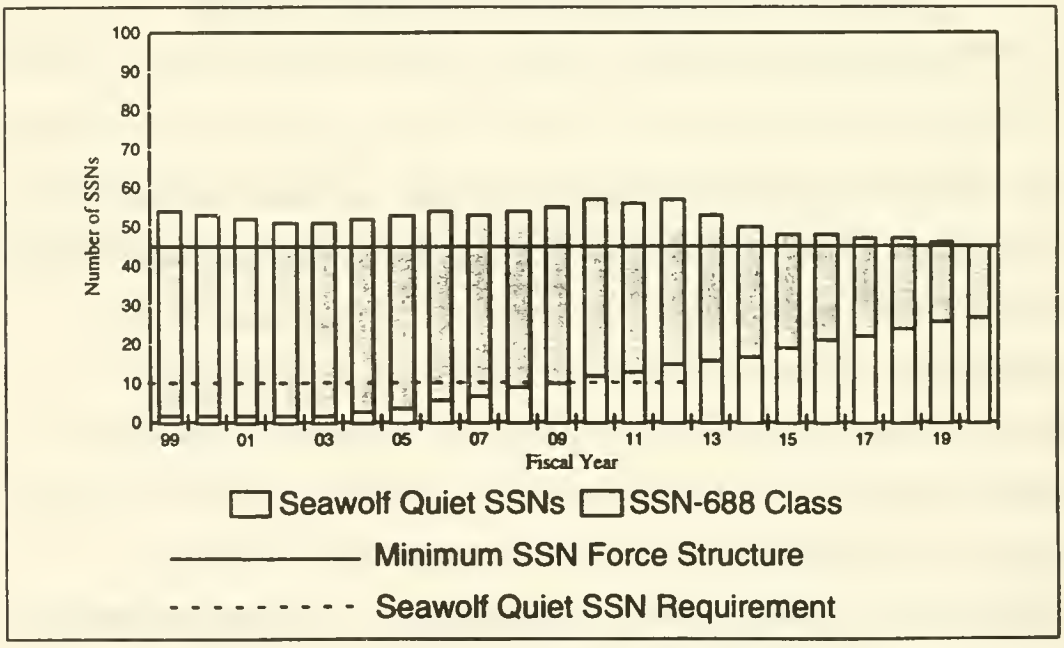


These three alternatives demonstrate that the Navy can maintain its approved force levels by acquiring fewer than 31 SSNs through 2014 as currently planned. Furthermore, if the Navy defers construction to 2003 it would not build the third Seawolf in 1996. The Navy could still achieve its approved force levels without building the third Seawolf if it chose either one of the first two alternatives by either consolidating submarine construction at Newport News Shipbuilding or finding another way to bridge the production gap at Electric Boat.

ALTERNATIVES TO THE NAVY'S SHIPBUILDING PLAN CAN MEET THE SUBMARINE THREAT

The Navy wants 10 to 12 submarines as quiet as the Seawolf by 2012 for the anti-SSBN and presence missions anticipated in that time frame. By implementing either of our first two alternatives, the Navy can have 10 to 12 Seawolf quiet submarines by 2012 without building the third Seawolf. If the Navy does not buy the SSN-23 and builds 24 new attack submarines, it can maintain its minimum force level and exceed its goal for Seawolf quiet submarines (see figure 5).

Figure 5: SSN Force Structure Without SSN-23 and 24 New Attack Submarines (1999-2020)



By deferring attack submarine construction to 2003, the Navy would not have 10 to 12 Seawolf quiet submarines before 2014.

Now let me turn to the recent Office of Naval Intelligence report, "Worldwide Submarine Proliferation in the Coming Decade," which discusses improvements in and growing numbers of foreign submarines. According to the report, Russia's frontline submarines are for the first time, as quiet or quieter in some respects than the SSN-688Is and Russia plans to continue reducing radiated noise on its submarines.

However, the report does not address other factors that should be considered to determine the overall superiority of U.S. and Russian submarines, such as sensor processing, weapons, platform design, tactics, doctrine, and training. This omission is significant since, according to the Navy, it is essential that these factors be considered in addition to acoustic quieting to determine the overall qualitative advantage of U.S. versus Russian submarines.

Public reports, news accounts, and more importantly other DOD publications--including the annual Director of Naval Intelligence Posture Statement--present information on some of the other factors that affect submarine superiority. These reports note a

decline in Russian submarines' operating tempos, order of battle, and construction programs. They also note that morale and discipline have deteriorated, personnel shortages are serious, and the frequency and scope of naval operations, training, readiness, and maintenance have declined.

It is also important to note that the intelligence community disagrees about the course of the future Russian submarine threat. For example, based on our preliminary work, we are aware of differences within the community concerning such issues as Russia's defense spending priorities, Russia's ability to maintain its production schedules, and future threat scenarios.

BUILDING SSN-23 FOR INDUSTRIAL BASE REASONS HAS NOT BEEN JUSTIFIED

DOD decided to build the SSN-23 in 1996 and commence with new SSN construction in 1998 at Electric Boat to support the nuclear shipbuilding industrial base. The United States has two builders of nuclear ships: Electric Boat, which builds submarines, and Newport News Shipbuilding, which builds aircraft carriers and submarines. In its bottom-up review, DOD considered several options to avoid the potential consequences of a gap in submarine construction. A key option considered was the consolidation of all carrier and submarine construction at one shipyard. DOD

reported that, under this option, $1.2 billion would be saved after accounting for about $625 million in shutdown and reconstitution costs from fiscal years 1995 through 1999. DOD rejected this option because of its concern about the resulting loss of competition and other long-term defense industrial base and national security needs.

In April 1994, we testified that DOD had not provided the basis for its position.[5] It was not clear what DOD meant by "loss of competition" For example, only one shipyard currently builds nuclear aircraft carriers, but DOD has not expressed concern about lack of competition in that program. Moreover, DOD has directed future nuclear submarine work to be done at the other nuclear-capable shipyard, virtually eliminating competition. It is not clear why DOD determined that two nuclear-capable shipyards are needed to protect "the long-term defense industrial base and national security."

Mr. Chairman, this concludes my prepared remarks. I would be happy to answer any questions you may have.

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[5] Navy Modernization: Alternatives for Achieving a More Affordable Force Structure (GAO/T-NSIAD-94-171, Apr. 26, 1994).

Mr. HUNTER. Thank you very much, Mr. Davis; if you and Mr. O'Rourke can remain available for questions.

We want to move now to Mr. James E. Turner, chief executive officer [CEO], General Dynamics Electric Boat Division. Mr. Turner, thank you for being with us. We have talked with a number of the Members of this committee in days past. You have this major issue before us. We would like your comments on it.

STATEMENT OF JAMES. E. TURNER, JR., CORPORATE EXECUTIVE VICE PRESIDENT, GENERAL DYNAMICS CORP.

Mr. TURNER. Thank you, Mr. Chairman and good afternoon members of the committee.

I appreciate being invited to address you this afternoon. Mr. Chairman, in the interest of time, I will summarize my written testimony and submit it to the committee.

Mr. HUNTER. Certainly, without objection, it is in the record. Just sharpen this issue with us and summarize it if you could, sir.

Mr. TURNER. Mr. Chairman and members of the committee, I am indeed proud of Electric Boat's tradition of building submarines. I appreciate the opportunity to present Electric Boat's plan to produce affordable nuclear submarines for our country's security.

Today, I want the committee to leave with three important points:

First, the SSN–21, the lead *Seawolf*, is on schedule for delivery a little more than a year from now, in the spring of 1996.

Second, Electric Boat has achieved a breakthrough in low-rate production of nuclear submarines. We have broken the obsolete culture of the past. We are bringing submarine design and construction into the information age.

Third, if this Nation is to preserve the capability to build affordable nuclear submarines, there must be a long-term commitment to stable, low-rate nuclear submarine production. There are no workable alternatives.

As the committee will recall, Electric Boat won the competition for both the SSN–21 and 22. I am pleased to report that the SSN–21 is now 80 percent complete and I am confident it will be delivered on time, in the spring of next year. As a result of initiatives developed by the Navy and Electric Boat, we will deliver this submarine and the followon SSN–22 within the congressional cost cap.

More immediately, this weekend, the lead *Seawolf* will be moved into its pre-launch position and be displayed to the public for the first time. She will be christened on June 24.

Mr. Chairman and members of the committee, we would be honored if you would join us for that ceremony where you can see this superb ship with your own eyes and also see, first hand, the product of the skilled workers at Electric Boat.

The *Seawolf* Program has laid the foundation for a new, more cost effective acquisition process that will enable us to build an affordable new attack submarine in a low-rate production environment.

The Navy estimates there will be significant savings for the new attack submarine because of lessons learned from the *Seawolf* Program. Essential to these savings was an early singleup on the de-

sign and then the execution of a lead ship construction contract at the same shipyard. The Navy is currently executing this strategy.

Indeed, these savings are just the latest demonstration that assigning lead ship design and construction to one shipbuilder is critical to affordability. The Trident Program has been described as one of the most successful procurement programs in the nation's history.

Assigning responsibility to electric Boat and committing to a stable production rate created a situation where knowledge and experience yielded significant efficiencies. For example, the number of hours required to build the 15th Trident was less than one-half that of the lead ship. Similar efficiencies and cost benefits can be achieved on new generations of submarines if the right choices are made now.

Now, concerning the breakthrough to support low rate production: Electric Boat is now 5 years into an intensive internal program designed specifically for one purpose, the delivery of affordable submarines to the Navy.

Electric boat is the nation's low-cost supplier of submarines and is acknowledged as the premier resource for nuclear submarine design and construction technology. We, therefore, are the overall best value.

Mr. Chairman, at Electric Boat, we have moved beyond the obsolete shipbuilding culture of the past. We have achieved a breakthrough in the low-rate production of submarines. We are the only shipbuilder that has done so. With the use of the highest technology, we are bringing submarine design and construction into the information age.

Submarines were once constructed like a watch being assembled through its stem hole. Components had to be painstakingly assembled and installed inside a completed hull by workers in awkward, cramped positions. It was a difficult, costly and tedious process with significant rework.

That was yesterday. Today, submarines are designed and built using the world's most advanced computer-based technologies and electronic visualization techniques. They are designed, assembled and tested in cyberspace before the first steel plate is ever cut.

Affordable submarines are built by converting computer bytes into hard steel, with entire decks sliding into place with components already installed and tested. These sections are then joined with complete systems already inside.

But technology alone is not enough. There are two prerequisites to making this system work. First, you must have the skill and insight to manage the process. Second, and perhaps even more important, you must have a single point of accountability for the design and construction process.

At Electric Boat, we have met the test. Computerization and other technologies are just part of the story. At Electric Boat, we are relentlessly pursuing the goal of affordability through a vigorous reengineering program as we transition from a building rate of three ships per year in the early 1990's to a low rate production. The reengineering effort is complementing incremental cost reductions with step improvements in performance.

These step improvements derive from a fundamental redesign of cost structures and operating practices, not by scaling down current activities and infrastructure, but a thorough clean-sheet change in the way we do business.

We are evaluating and redesigning our key business practices to achieve maximum efficiency at the lowest cost. We have introduced major structural and organizational changes, consolidating functional areas and increasing spans of control and responsibility. At the same time, we are reducing plant, property and equipment, terminating lease agreements and razing older buildings.

In cooperation with the Navy, Electric Boat is leveraging the single shipyard design-and-build approach for the New Attack Submarine Program with state-of-the-art electronic design tools and the Integrated Process and Product Development teams.

These teams include members from across the Electric Boat organization, suppliers and representatives of the Navy. Working together, the team members ensure that the new attack submarine design is geared to the most modern production methodologies and facilities.

This cultural break is benefiting our current programs and will enable us to support the Navy's submarine requirements by designing and building the world's best submarines at an affordable price.

Our actions to restructure Electric Boat from top to bottom have already paid off. As a result, we have reduced the rates we charge our customer to the extent that the savings to the government on our projected workload has already exceeded $600 million.

Let me emphasize and important point. Electric Boat has restructured and reengineered the company, a very tough and painful process, so that we can build the Nation's most affordable nuclear submarines.

Electric Boat does not rely on other work to be affordable. We focus on what we do better than anyone else, designing and building quality submarines at the lowest price, at a price the Nation can afford.

As you know, the Navy has developed a plan to build 10 to 12 submarines with *Seawolf*-stealth characteristics by the year 2012 to meet joint war fighting requirements. Success of that plan depends on an effective transition to an affordable new attack submarine design and construction in a stable, low-rate production environment.

Electric Boat believes the Navy's proposal for fiscal year 1996 funding to complete the third *Seawolf* and funding the New Attack Submarine beginning in fiscal year 1998 represents the most prudent transition strategy, one that will effectively meet the Nation's needs for a capable and affordable underseas fleet. The Navy, the Department of Defense and independent organizations have repeatedly studied the options to transition to the New Attack Submarine.

Their conclusions are consistent; complete the third *Seawolf*. Some $900 million has already been invested in the third *Seawolf*. About another $1.5 billion is needed to provide this ship to the fleet; about the same amount the Navy says it would cost to terminate the *Seawolf* Program.

The choice is simple: Complete the third *Seawolf* for $1.5 billion and provide the Navy with the advanced capabilities it needs, or spend the same amount of money and deprive the Navy of a ship it needs to fulfill its mission.

Termination is risky and costly. Stopping the *Seawolf* now, means that reconstitution of the submarine industrial and technology base will be needed in the future.

Turning off this highly skilled, unique industrial base and then trying to restart, imposes an extremely high cost and an unacceptable technological risk. It does not save money. It just shifts costs to future years.

Beginning construction of the new attack submarine in 1998 is also crucial to the transition to an affordable design and construction. Deferring that program raises the same troubling questions about the future of the submarine industrial base as does terminating the *Seawolf*.

Reconstitution is neither simple nor cheap. Frankly, under existing conditions, reconstitution of an affordable low-rate nuclear submarine capability in this country will not be possible.

Further, terminating *Seawolf* or deferring the new attack submarine beyond 1998 would also rob the nation of our ability to produce affordable submarines in a low-rate production environment. The new system is the fruit of experience that will wither away if submarine production is stopped in its tracks.

In summary, I would like to return to my initial thoughts. The lead *Seawolf* is on track. It will be delivered on time and within the caps set by Congress. The Navy will have the most capable an versatile submarine in the world.

Electric Boat has moved beyond the old culture and is successfully reengineering toward affordable low-rate submarine production. The nay-sayers did not think it could be done. We are proving them wrong.

If this nation is to have the ability to build affordable nuclear submarines, there must be a commitment to stable low-rate production. We must take advantage of the $900 million already invested and complete the third *Seawolf*. Equally important, we must maintain a 1998 start of the new attack submarine.

Thank you.

NOT FOR PUBLICATION
UNTIL RELEASED BY
HOUSE COMMITTEE ON NATIONAL SECURITY

James E. Turner, Jr.
Corporate Executive Vice President
General Dynamics Corporation

President
Electric Boat Division

Testimony before
the U.S. House of Representatives
Committee on National Security
Military Procurement Subcommittee

Washington, D.C.
March 16, 1995

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I. INTRODUCTION

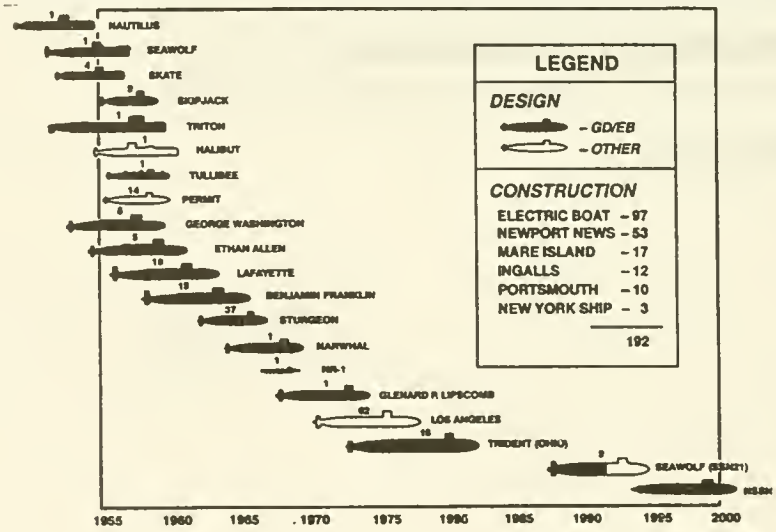
Mr. Chairman, and members of Congress.

I'm Jim Turner, Executive Vice-President of General Dynamics Corporation, and President of its Electric Boat Division.

I would like to thank you for this opportunity to present my perspective on the requirements for continued production of nuclear attack submarines.

As you know, the name "Electric Boat" is synonymous with submarine technology. Electric Boat designed and built the Navy's very first submarine, HOLLAND. Electric Boat designed and built the very first nuclear submarine, NAUTILUS. Electric Boat designed and built the very first strategic missile submarine, GEORGE WASHINGTON. As testament to our design expertise, of the 19 nuclear submarine classes developed in this era, Electric Boat designed 15. Of these 19 nuclear propulsion plants developed, Electric Boat designed 18. Of all strategic missile submarines ever produced by this country, Electric Boat designed every single one. It should be no surprise, then, that the Navy's technical evaluation resulted in the selection of Electric Boat to design and build the New Attack Submarine. On the production side, the Navy has ordered a total of 192 nuclear submarines from 6 shipyards. Electric Boat was awarded more than half. Of the 62 LOS ANGELES (SSN688) Class submarines authorized since FY70, Electric Boat was awarded more than half. All other submarines authorized in the last 25 years — 18 TRIDENTs and 2 SEAWOLF Class — have been awarded to Electric Boat. It is no wonder that Groton, Connecticut — home to our submarine design and final assembly facilities — proclaims itself to be the "Submarine Capital of the World".

ELECTRIC BOAT IS THE WORLD'S PREMIER RESOURCE FOR NUCLEAR SUBMARINE DESIGN AND CONSTRUCTION TECHNOLOGY



Two years ago I testified before your colleagues on the Defense Subcommittee of the U.S. Senate Appropriations Committee. At that time, I stated that one action which would aid us in the defense industry would be for the government to project its basic defense requirements. A predictable business forecast would thus allow us, in industry, to plan our business strategy and adjust our resources and investment to meet market demands. I also indicated that over the longer term, what the nuclear submarine industrial base requires is a national investment strategy, a key element of which would be a new acquisition approach. The key characteristic of this approach would be low-rate production of fully capable submarines that provide baseline capabilities, as well as the potential for modular, mission-specific reconfigurations. This strategy would maintain ship affordability, mission flexibility and undersea superiority.

Electric Boat is not here asking for a subsidy. We don't need that. We're successfully building down to the very low rate of submarine production ahead. We don't want a handout; what we are seeking is commitment to the DoD, Joint Chiefs of Staff and Department of the Navy plan that delivers the nation's undersea warfare requirements in the 21st century. This request is consistent with the DoD announced policy which was further committed to in the NSSN Acquisition Decision Memorandum. This commitment is critical to retaining our supplier base by assuring them a stable and predictable submarine market in the future.

Today, I note that the Defense Department and the Navy have provided this commitment. The submarine force level requirements have been identified — no, not an absolute number, but rather, a narrow range. What is important here is that it is not a wish list. The requirement is based on our national security needs. In turn, the Navy is implementing a new submarine acquisition approach. It is a plan which maintains the key elements of our submarine industrial base, and more importantly, industrial readiness. It is an affordable plan which provides technologically advanced submarines. And it is a prudent plan based on low-cost/low-risk transition to a new attack submarine.

So, the goal has been defined, and the strategy has been laid out. What remains, of course, is the implementation. I am not here to tell you what Electric Boat is going to do. We're way past the planning stage. I am here to tell you what Electric Boat is doing. I have taken the information that I asked for two years ago — the goal and the strategy — and established Electric Boat's direction. We are now well down the path of reengineering Electric Boat in a manner that will allow the men and women of Electric Boat to continue what Electric Boat does best: build the best submarines in the world for the U.S. Navy at the best value to the taxpayers of this country.

I use the word "continue" purposefully. I would point out to you that every submarine under construction at Electric Boat is either on or ahead of schedule. Every one. And, in just two days, this Saturday, Electric Boat will move the SEAWOLF, the world's most capable submarine, onto her launch pontoon for the whole world to view. Not just an artist's rendition. A real submarine, 80% complete. And close behind, her sister ship, CONNECTICUT (SSN22), now more than 40% complete. I

would also note here that both these ships were competitively awarded to Electric Boat because we are the low cost builder.

With regard to the Congressionally-mandated cost cap on the SEAWOLF program, Electric Boat is performing to its contractual agreements, and is confident in the scheduled May 1996 delivery of the first ship. Electric Boat is performing to and ahead of contract terms, with every submarine in our backlog. Every one. Even though we are in a near cataclysmic downsizing as we build out the last 688 and TRIDENT submarines. We are achieving these results, in no small measure, because of our reengineering the business. We have been reengineering for two years in anticipation of what we must be in order to build submarines affordably at the low production rates we now face. Our thrust has been to provide the United States with affordability through change in process and organization, not to ask for affordability through increased volume in numbers and types of ships. Reengineering now. And getting results now. Before I provide specific details of this, let me leave with you one more thought as to the significance of what's going on here.

When I introduced myself, I mentioned several of the many accomplishments that have resulted in Electric Boat being recognized as the world's premier resource for submarine design and construction technology. There is one other accomplishment that I intentionally reserved to discuss here, in order to put reengineering in its proper perspective.

It occurs to me that, since the advent of naval nuclear power, there have been many evolutionary advances — thousands — in how we design and build nuclear submarines. Laser welding. Sound-isolation mounts. Electronic design. These are but a few. But in all the years since NAUTILUS made her debut, there has been but one truly revolutionary change in how we design and build submarines — the modular design and construction process, pioneered by Electric Boat. It changed everything. We built new facilities around this process — the Automated Frame and Cylinder Manufacturing Facility at Quonset Point, and the Land Level Ship Construction Facility at Groton. By comparison, the old way of producing submarines was analogous to putting a watch together through its stem hole. I mention this revolutionary change now, because I believe we are on the verge of yet another revolutionary change in submarine design and construction.

A change that portends equal significance. A change that is already embedded in our reengineering. It's called Design/Build, or Integrated Product and Process Development, as designated by DoD. It's not a new term. It just has a new meaning. And it's not just a buzz-word or a slogan. It's a revolutionary process for producing affordable submarines, and it is only taking place because it is part of the Navy's strategy for continued production of nuclear attack submarines. From my perspective, without speaking for the Navy or the Department of Defense, the NSSN program is leading the nation in acquisition reform and integrated product design and development.

Design/Build has new meaning, because now it is more than just our engineers working in concert with the shipyard trades. The Design/Build concept is a team, a team that also includes our suppliers, and most importantly, includes the Navy. And it is a change in how we do business, a change that is affecting Electric Boat so much that, internally, we describe it as a culture change. The Design/Build process in place at Electric Boat has been validated "world class" by an independent Navy review team. I am confident that as you review the specifics of this concept, you will realize how integral Design/Build is to the notion of affordable submarine construction.

As I mentioned earlier, two years ago I identified the needs of industry: Tell us the submarine force level goal; Tell us the strategy for continued production of nuclear attack submarines. These requests have been satisfied. From my perspective, I have no new requirements to add. All I ask of you, the Congress, is: Stay the Course. You have a shipbuilder who is the low-cost supplier. A shipbuilder who is meeting his schedules. A shipbuilder who is financially performing to customer and shareholder requirements. And you also have a team. A team made up of the Navy, Electric Boat, and the submarine industrial base suppliers. This team is working together to deliver an affordable New Attack Submarine. This team is working together in a way that can only be reminiscent of the efforts to produce NAUTILUS and GEORGE WASHINGTON. Let this team fulfill its commitment to you. Stay the Course.

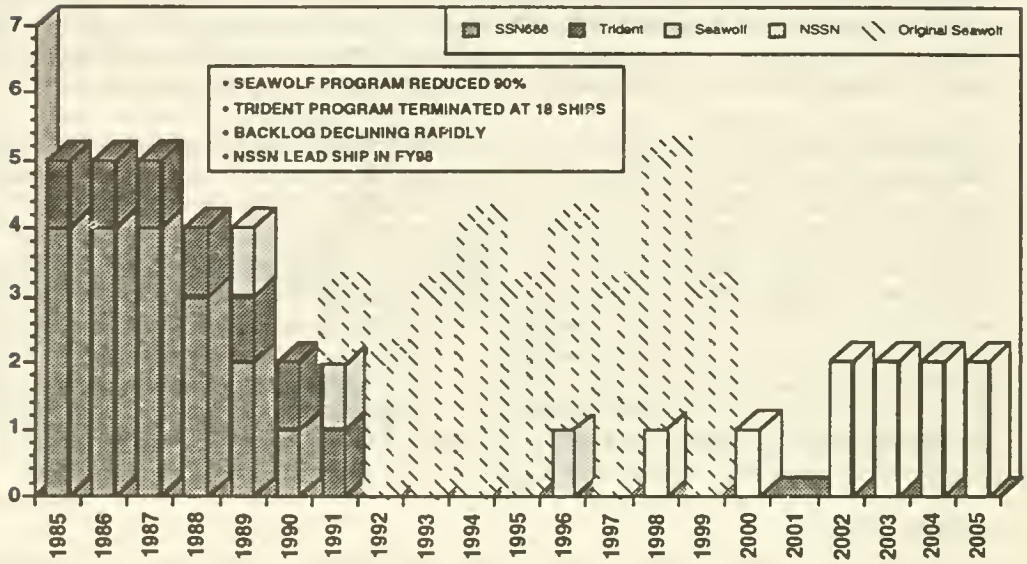
II. PERSPECTIVE

The United States nuclear submarine industrial base embodies fifty years of investment in advancing submarine technology — an investment in dollars, in labor, and in lives. The return on this investment has been the design and production of 192 nuclear submarines, with 9 still under construction.

The end of the Cold War and the subsequent break-up of the Soviet Union in 1991, made it clear that the defense industry, especially the nuclear submarine segment, needed to change dramatically.

The industry is well underway in transitioning from 40 years of Cold War production rates, to a new era of low rate production. The industry has already absorbed a 90% cut in production — from 4.5 ships per year in the '80s to less than half a ship per year in the '90s. The SEAWOLF program was reduced from 29 ships to 3 ships; the TRIDENT program was terminated at 18 ships from a one-time projection of 24.

THE DRAMATIC REDUCTION IN THE SEAWOLF PROGRAM INITIATED A PRECARIOUS TRANSITION PERIOD IN SUBMARINE PRODUCTION



The Navy has developed a plan which preserves essential submarine technology and production and supplier capabilities with acceptable risk at an affordable cost. Independent analysis has validated the plan's assumptions and conclusions. DoD and the Administration support the plan and have requested the funds to accomplish it.

The Navy plan is based on three key points: Low Rate Production of submarines has advantages over shutdown/reconstitution; Two nuclear capable shipyards should be preserved; and the New Attack Submarine (NSSN) must be affordable.

Electric Boat is actively engaged in implementing its portion of that plan: reengineering processes, facilities, and organizational culture so that it can provide an affordable submarine to the U.S. Navy.

III. ENSURING INDUSTRIAL READINESS: LOW RATE PRODUCTION VS. RECONSTITUTION

The long-range Navy submarine procurement plan embodied in near-term SSN23 construction and the NSSN Acquisition Strategy is based on a realistic, comprehensive assessment of future requirements, current capabilities, and cost-effective approaches. Explicit in this plan is the fact that alternatives involving shutdown and reconstitution of some or all segments of the submarine industrial base might well be

impossible. Shutdown and reconstitution would be more costly, would involve significantly higher risk, and may fail to meet force level objectives for quiet submarines.

Over the past three years, 14 separate studies have examined the nuclear submarine industrial base. The consensus of these studies is that steady, low-rate production is the optimum and most cost-effective approach to sustaining the nation's capability to design and build nuclear submarines. Not a single study recommended the shutdown and reconstitution option.

The nuclear submarine is an exceptionally complex engineering and manufacturing undertaking representing an unusual combination of nuclear power, sophisticated electronics and cold steel. Applications of these seemingly incompatible partners must be made with strict requirements for safety and exceptional attention to detail in all areas of the design, construction, testing and operation of the nuclear submarine. Attendant with these strict requirements is the equally complex task of integrating all the component parts into a single product.

Nuclear submarine shipbuilding capability is extremely difficult to establish and maintain, and is limited to shipyards with large and experienced production workforces. Maintaining this capability requires a large, cyclically loaded workforce that can apply diverse skills and technologies, perfected through years of experience, to build a submarine with a production cycle time of approximately five years.

Construction and engineering personnel work very closely with one another and rely heavily on the experience and knowledge gained from each other to improve construction efficiency and technology. Critical manufacturing skills and specialized technologies such as modular sectional construction, material test and development, stealth and acoustic technologies are all utilized, improved and rigorously challenged in the nuclear submarine shipbuilding environment.

As ADM DeMars said in his report on the preservation of U.S. Nuclear Submarine Capability, *"Experienced ship and equipment designers cannot sustain their skills or generate useful products without the constraints of production line and waterfront reality. Paper designs always appear to work — the problems are in building and operating equipment."*

Barriers exist to reopening facilities tailored to submarine construction. Requalification of suppliers would be costly and time-consuming. DoD studies have found "long lead" times of up to 9 years between order and first delivery of nuclear materials. Environmental restrictions could impact processes or equipment which had ceased to be "grandfathered". Uncertainty of the future business outlook would discourage corporate retention of key facilities or re-investment in new facilities. Valuable waterfront property would most likely be converted to other uses.

Shutdown and reconstitution costs would undoubtedly exceed the proposed low rate production outlays. The RAND study indicates an aggregate shutdown/restart cost of

at least $2.0 to $3.5 billion, not including the costs associated with increased programmatic risk, loss of contingent employment and revenues to state and local governments, and other social welfare costs. Further, RAND concedes that initial estimates are apt to underestimate actual returned costs by 50%–300% due to the uncertainty and risk involved. The current Navy submarine acquisition plan spends $1.5B on SSN23, for which you get a state-of-the-art submarine, and avoids the unbounded shutdown/reconstitution costs.

Start-up introduces unacceptable costs and risks into any submarine program. Startup of a nuclear shipbuilding program was difficult when the technology was in its infancy, and might well be impossible today. Consider the problems experienced at Ingalls and New York Shipbuilding when they were awarded SSN construction contracts in the '60s. Even the Quincy Division of General Dynamics, which drew on Electric Boat for expertise, experienced problems.

Recalling skilled personnel is apt to be ineffective, as top performers find secure jobs elsewhere. Rapid buildup with green labor results in skill mix dilution, impacting productivity and quality. Not least of all, the mindset of documented perfection — required for SUBSAFE, nuclear reliability and safety — would take years to regain.

IV. ENSURING INDUSTRIAL READINESS: TWO NUCLEAR CAPABLE SHIPYARDS

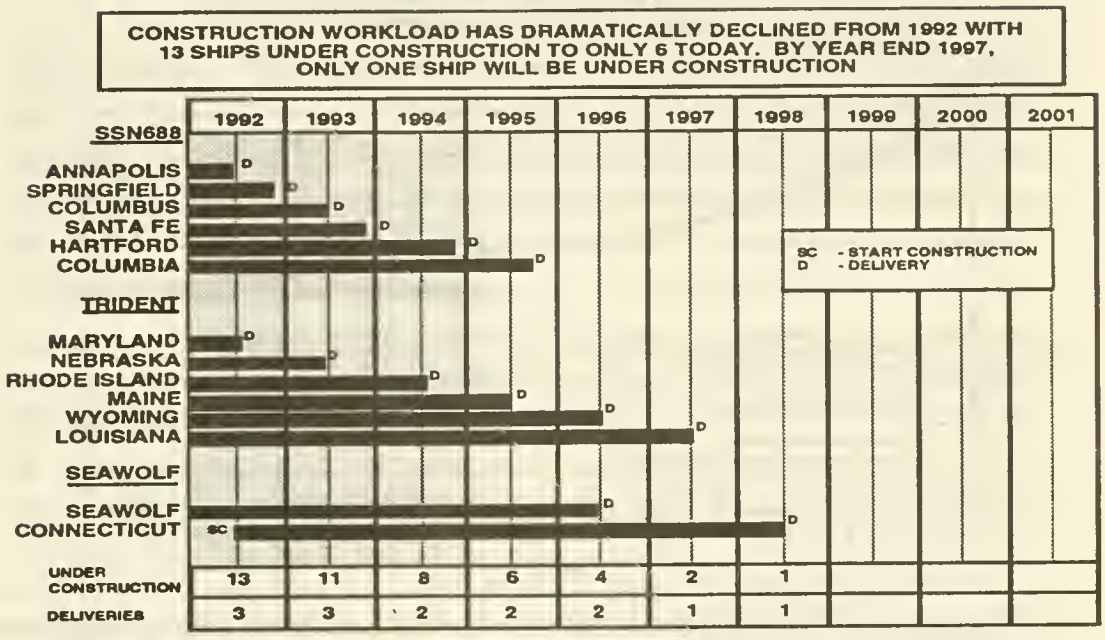
The Navy plan for submarine acquisition recognizes the significant advantages to the government and national defense from maintaining two shipyards capable of designing and building nuclear powered ships. Both the intangibles of risk and future uncertainty, and the very concrete elements of cost and current capability, have been factored into the Navy position.

Assigning carrier production to Newport News and submarine production to Electric Boat keeps two nuclear capable designers and builders active. In the event of a natural disaster or economic work stoppage, the Navy can count on one nuclear shipyard remaining active.

Under the Navy's acquisition plan, the two nuclear capable shipyards will not be competing head-to-head for submarine construction contracts during the transition period of the NSSN program. However, the potential for competition, and the Navy ability to compare prices and rates on nuclear construction work, will continue to exert downward pressure on negotiated contracts at both shipyards. In addition, maintaining two nuclear capable shipyards supports industrial readiness goals, should changes in the future strategic environment demand higher production rates.

Implicit in the Navy decision to maintain two nuclear capable shipyards is that it is ultimately the most cost-effective and low-risk way to manage the technological development and production of future classes of nuclear powered vessels. Electric Boat fully supports that position, and the acquisition strategy which is consistent with it.

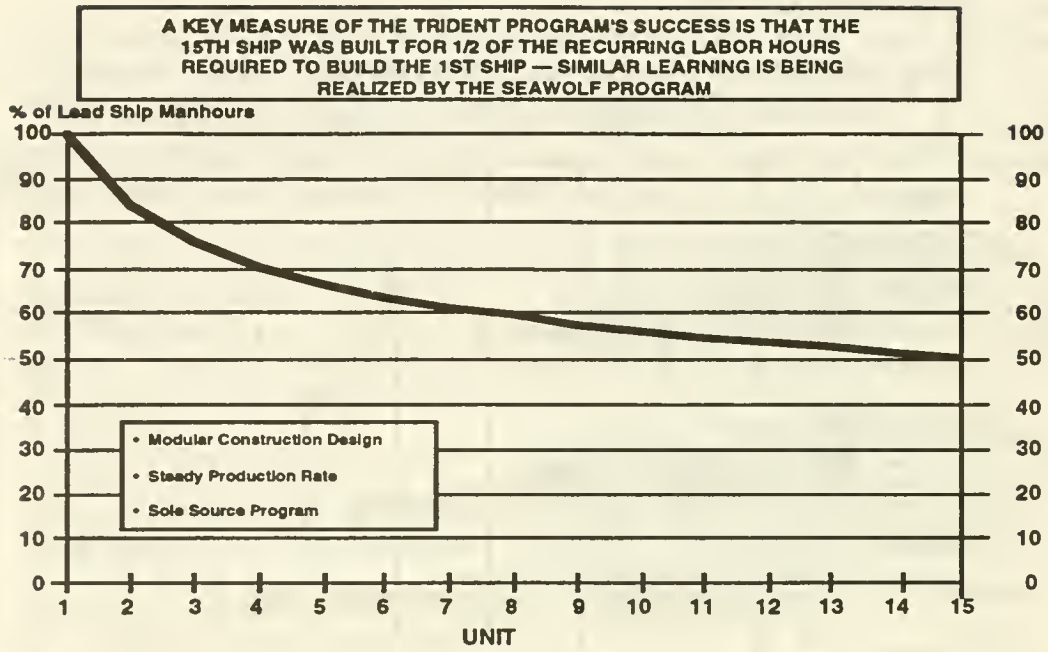
V. PROGRAM STATUS



OHIO CLASS (TRIDENT) PROGRAM

Electric Boat has been the sole designer of strategic missile submarines (SSBNs) for the United States Navy, and is the designer and sole builder of the Navy's current SSBN program, the TRIDENT. As an integral part of the United States nuclear deterrent strategy, the TRIDENT's basic mission is to remain hidden at sea, equipped with nuclear-armed ballistic missiles, and thereby deter a strategic attack on the United States.

The United States Navy has awarded Electric Boat construction contracts for 18 TRIDENT Class submarines since the inception of the TRIDENT program in 1970. The TRIDENT construction program is scheduled to be completed upon delivery of LOUISIANA to the Navy in June 1997. As of today, Electric Boat has delivered 15 of the TRIDENT Class submarines to the Navy, all ahead of schedule. The next TRIDENT submarine , MAINE, is targeted to be delivered in June 1995.



Throughout the TRIDENT program, Electric Boat has consistently achieved significant labor reductions per ship. During the course of the TRIDENT program, Electric Boat introduced automated hull cylinder fabrication, a manufacturing process which has revolutionized the construction of submarines. This process has permitted Electric Boat to adopt a modular construction technique whereby sections of the submarine hull are substantially outfitted with internal components at Electric Boat's Quonset Point, Rhode Island facility. The hull segments are then assembled at Electric Boat's land-level submarine construction facility in Groton, Connecticut. A key measure of the TRIDENT program's success is that the 15th ship was built for 1/2 of the recurring labor hours required to build the 1st ship.

LOS ANGELES (SSN688 CLASS) PROGRAM

Electric Boat is the principal manufacturer of attack submarines (SSNs), including the SSN688 Class fast attack submarine. In 1970, the United States Navy began procuring the SSN688 Class submarine, an attack submarine which is faster and better-armed than its predecessors. The final 31 ships of the SSN688 Class are equipped with a vertical launch system for carrying 12 Tomahawk cruise missiles in addition to the 25 weapons.

Electric Boat was awarded construction contracts for 33 of the 62 SSN688 Class submarines procured by the Navy, despite the fact that Electric Boat was not the lead designer of the SSN688 Class. As of today, Electric Boat has delivered 32 of the SSN688

Class submarines in the Navy. Electric Boat will deliver its final SSN688 Class ship to the Navy in the third quarter of 1995.

During the course of the SSN688 Class construction, Electric Boat applied the modular design and construction techniques it developed during the TRIDENT program to the SSN688 program. As a result, Electric Boat was able to increase the degree of modularization of the ship's construction from approximately 10% to 50%, thereby achieving substantial efficiencies. For example, Electric Boat has reduced by up to 19 weeks the costly construction period between hull completion and delivery. It also has significantly reduced the wet dock construction period, which is the period from launch to delivery.

SEAWOLF (SSN21) CLASS PROGRAM

Electric Boat is currently building SSN21 (SEAWOLF) and SSN22 (CONNECTICUT), the lead and second ships of the SEAWOLF Program. Electric Boat was awarded the contracts to build these ships in direct competition with Newport News Shipbuilding.

In contrast to historical evidence which indicates program stability is a key characteristic of successful weapons systems, the SEAWOLF submarine program has been tumultuous. In 1990, as a result of the Major Warship Review, the program's production rate was cut in half. Subsequent reductions and rescissions in 1991 and 1992 further truncated the program to the three ships currently under construction or planned — a 90% reduction over a span of just three years. Despite the program's instability, Electric Boat's SEAWOLF construction program has been well run and continues to perform within the terms and conditions of the contracts.

SSN21 (SEAWOLF) is approximately 80% complete. On Saturday, March 18, the ship will be moved from our main assembly building onto the Land Level Construction Facility pre-launch position in preparation for Float-Off on April 15, this year. The ship is on track to delivery to the U. S. Navy on May 24, 1996.

The second SEAWOLF ship under construction at Electric Boat, SSN22 (CONNECTICUT) is over 42% complete. Electric Boat has realized a significant learning advantage by applying SSN21 experience to the second ship. The actual manhours required to complete an identical portion of work on SSN22 averages just 85% of the hours spent on SSN21. This performance improvement matches the learning curve of the TRIDENT program. This ship is also on track to its scheduled delivery in June 1998.

Electric Boat's objective for the SEAWOLF construction program is clear: Deliver the SSN21 and SSN22 in the most cost effective manner in support of the Congressionally mandated cost cap. Electric Boat can meet that requirement through continued progress in the integrated shipbuilder/Navy management approach which has recently been implemented at the direction of Assistant Secretary Slatkin.

In January of this year, SEAWOLF Program process and management changes were introduced as a result of a DoD/Navy Cost Cap Analysis Team program evaluation. Electric Boat is working closely with the Navy to fully implement the SEAWOLF Cost Cap Analysis Team's initiatives, which will minimize cost and streamline program execution.

The changes implemented include the creation of an Integrated Process Team that will manage the program from the Navy's Supervisor of Shipbuilding Offices at Groton, Connecticut. Additionally, a SEAWOLF Executive Oversight Committee was established to operate out of the Naval Sea Systems Command in Washington. These changes have greatly strengthened, as well as streamlined, program oversight and facilitated shipbuilder progress by placing greater responsibility for resolution of construction issues at the shipyard level.

Completing SSN23 enables Electric Boat to refine SEAWOLF "lessons learned" and further capitalize on construction learning efficiencies. In all the studies and discussions surrounding the issue of building the SSN23, it is easy to lose sight of our objective. Our objective — Electric Boat's and the Navy's — is a modern, capable nuclear submarine force for the 21st century. The means to achieve that objective is an innovative, active and technologically advanced submarine industrial base. Building the SSN23 ensures that the means will be there when we need it.

The SSN23 also represents a transitional link to ensuring affordability on Electric Boat's current construction backlog and future NSSN workload, thus avoiding large reconstitution costs. Completing SSN23 is the right decision for industry. It sustains the national ability to produce high technology submarines at both the shipbuilder and supplier levels.

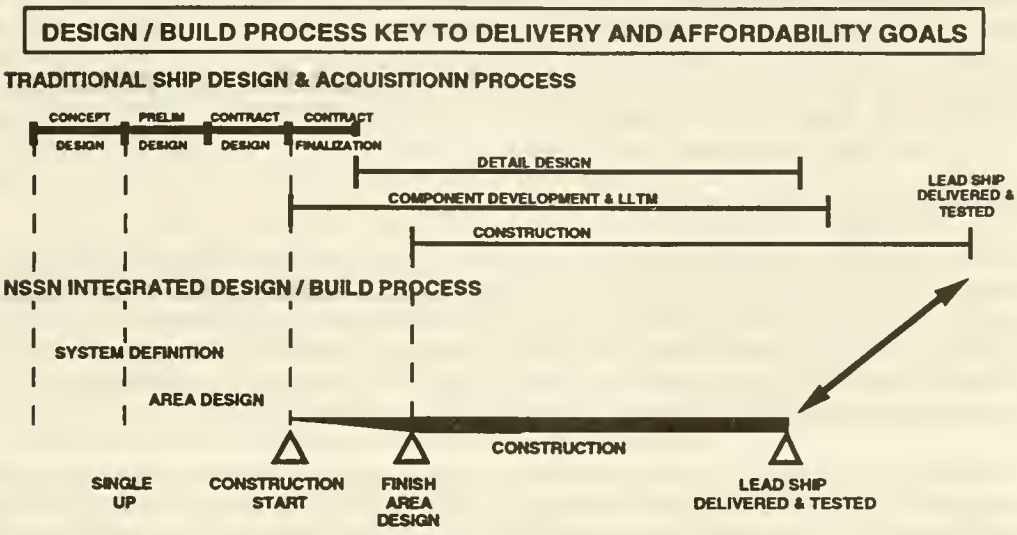
VI. NSSN PROGRAM

It is clear that submarines will continue to play a vital role in the force of the future. It is equally clear that they must be acquired affordably because of the constraints of the Navy procurement budget. The objective, therefore, is to design and build the most cost-efficient platform fully capable of performing safely, effectively, and reliably in all projected operating environments. A secondary goal is to acquire such platforms at the right time and in the right numbers to meet force levels. The procurement plan put in place by the Navy represents a major step toward acquisition reform and is the best strategy to transition from the SEAWOLF to the more affordable NSSN.

The Navy has applied several key initiatives to NSSN acquisition, all designed to reduce cost and ensure affordability. These initiatives include both new ideas and application of "lessons learned" from previous successful programs.

Selection of a single Design/Build contractor for the lead NSSN is key to achieving the advantages of the Design/Build process, both from an acquisition streamlining standpoint and from a design development position. The NSSN acquisition approach

and Design/Build process, as illustrated below, has enabled the Navy to shorten the overall acquisition cycle dramatically. It enables the Navy to make the most meaningful cost/capability/schedule tradeoffs, and to minimize the traditional liability associated with the Navy warranting the design to the builder. The acquisition strategy and contract structure envisioned places the Navy, the designer/builder, and the supplier base in partnership to produce the most affordable product.



The Design/Build partnership allows Electric Boat to capitalize on our unique manufacturing and production work practices and facilities. Further economies are being realized because the early single-up decision permits an integrated product and process development. This Design/Build approach focuses on the parallel development of products and their manufacturing process. This approach reduces product development time and cost by considering all elements of the product life cycle — from conception through disposal — including quality, cost, schedule, and user requirements. Realizing these benefits, many other companies have also started to use this approach as the basis of their future competitive strategies. It is significant to point out that in March of 1994, an independent Navy review team validated Electric Boat's Design/Build process, and favorably compared it to world leaders such as Boeing, Chrysler, and Northrop.

Design development has focused on "cost based platform" production. Use of existing components and systems design is being planned to minimize design and production cost. Commercial components and standardized parts will also be used, to a degree never before achieved, abetted by innovative approaches to configuration, arrangement, and deck structure. In addition, production costs will be minimized by concentrating outfitting and assembly in a factory environment rather than within the shipyard.

Current NSSN design development optimizes design modularity. In addition to applying modular construction efficiencies, it provides the operational benefit of reconfigurability for multi-mission requirements, and the capability for upgrades and insertion of new technology without the traditional barriers to change.

The NSSN program is on track in accordance with the Navy's Acquisition Strategy. The Defense Acquisition Board granted approval for Milestone I in August of 1994, initiating the Demonstration and Validation (Dem/Val) phase for the NSSN as an ACAT I D program. The Acquisition Decision Memorandum went on to say that the Navy should submit documentation for approval including *"an Acquisition Strategy Report: (a) reflecting the plan to initiate detail design/construction of the lead ship at the Groton, Connecticut Shipyard, with the lead ship in FY98 and lead ship nuclear reactor advanced procurement in FY96 and (b) reflecting a combat system acquisition strategy which involves a significant degree of private sector involvement in planning an open system architecture."*

DAB Milestone II, currently planned for September of this year, will authorize Engineering and Manufacturing Development. As part of the Phase I NSSN program activity leading up to Milestone II, the Cost and Operational Effectiveness Analysis (COEA) will again assess the affordability and appropriateness of the design as it has developed. The progression from Milestone I to Milestone II is indicative of the success being achieved under the Navy's Acquisition Strategy.

Development of the conceptual ship design and propulsion plant is proceeding rapidly at Electric Boat. Already, the advanced electronic design systems and methodology being developed and employed on the NSSN have created a product model for the design and construction of the ship. This is far beyond what would traditionally have been available at the conceptual stage, and enables development and validation of systems, components, and modules to proceed in accordance with an integrated schedule, well before construction of the ship begins. All participants — the Navy, Electric Boat, and the myriad of critical suppliers — are working together to the same targets for decision making, design, and production. This will significantly reduce the contract change activity which has traditionally challenged new designs.

VII. REENGINEERING THE BUSINESS

Electric Boat's management believes the changes to defense spending levels of the last several years are both structural and long-term. As such, these market changes demand significant and enduring changes to the way we have done business. Electric Boat has initiated major changes in the design, production, and processes to meet the dual challenge of affordability <u>and</u> very low rates of production.

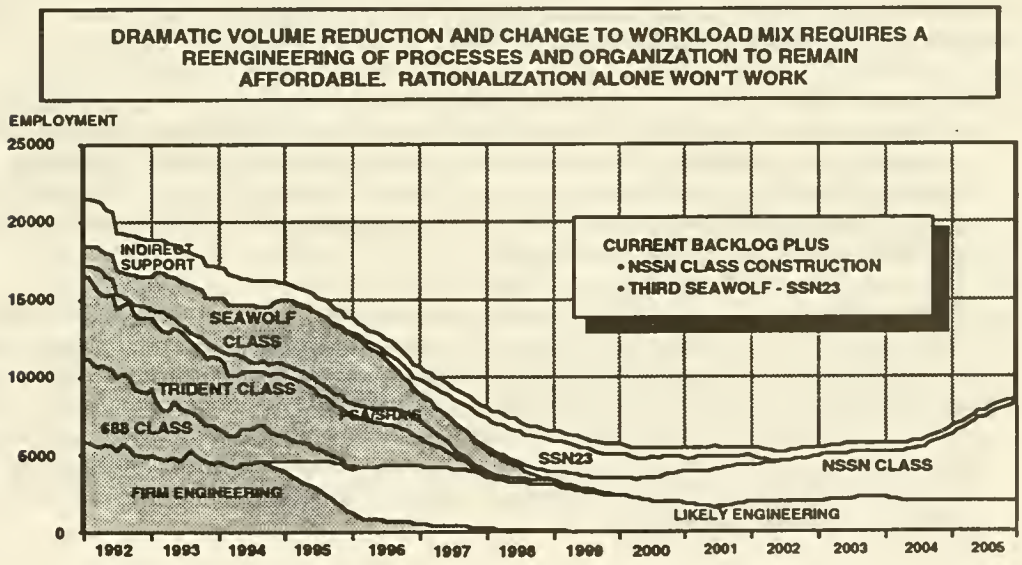
Electric Boat is presently in the midst of reducing submarine production from 3 ships per year during the early 1990's to a projected level of 1/2 ship per year through the remainder of the decade. The current production backlog runs out in 1997–1998, with

completion of the last TRIDENT Class submarine and the second SEAWOLF, SSN22. Electric Boat employment, which exceeded 22,000 in 1992, has been reduced to approximately 15,500 through layoffs and attrition.

In 1989, in anticipation of a highly competitive SEAWOLF program, Electric Boat management began a concerted effort to reduce costs. These efforts, although successful, were still based on projected production levels of one or more submarines per year. With the abrupt truncation of the SEAWOLF program, it was apparent that a much more aggressive approach would have to be initiated if Electric Boat was to preserve the value in our backlog and position ourselves for future levels of low rate production. In response to this challenge, a Division-wide reengineering effort was initiated in mid-1993 to ensure the future viability of the business and the affordability of its submarines.

The first step in our reengineering process was to look beyond our backlog. Electric Boat evaluated a comprehensive set of options and strategies in order to develop a realistic business forecast. Recognizing the uncertainty and risk in this market, a thorough assessment of market opportunities was conducted covering submarine design and construction, overhaul and repair, and commercial business. As a result of this assessment, a decision was made to focus on continued submarine development and construction. Finally, a business forecast was developed: SSN23 award in FY96, NSSN design and construction in FY98, limited follow-on NSSN construction, and a conservative level of design and related support services.

This minimal, and protracted level of business has dramatically impacted our projection for business volume and mix. Given our forecast, we believe that Electric Boat employment will eventually drop to approximately 6,000 by 1998.



More importantly, however, this business forecast has also led to the development of Electric Boat's strategy for success in the new defense environment: Reengineering to maintain affordability. The implementation of this strategy has been underway for two years, and we are meeting our goals. Aggressive financial overhead targets have been established, based on a realistic assessment of projected business. Every process is being evaluated and reengineered, as appropriate, to drive out cost in order to meet plan targets. And, finally, improved management systems are being installed to closely monitor and control the plan.

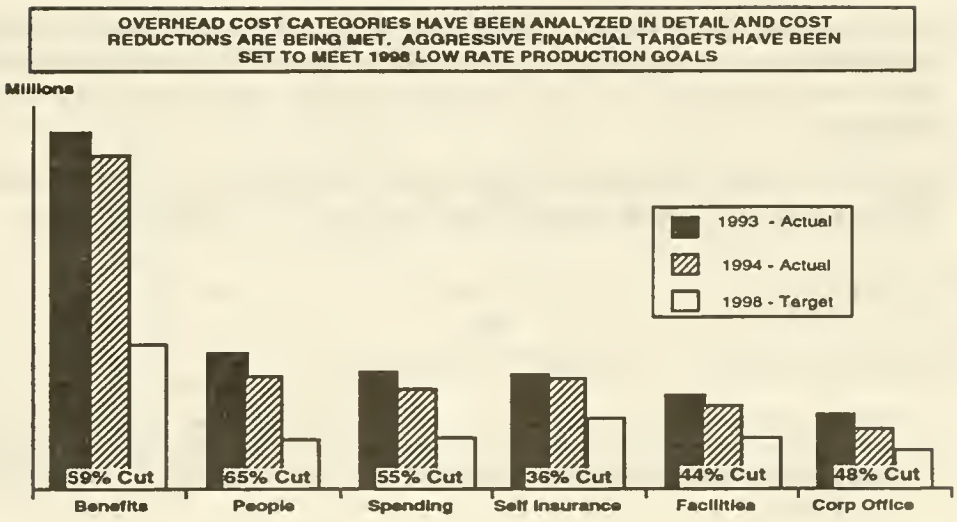
The approach is to complement incremental cost reductions with step improvements in performance. These step improvements are derived from a fundamental redesign of cost structures and operating practices, not by scaling down current activities and infrastructure, but through a clean-sheet, minimalist redesign.

All of the Division's functional areas are being subjected to this process. At the outset, Electric Boat set aside traditional organizational structures and grouped functions into three broad areas: Innovation (Program and Product Development), Delivery (Manufacturing and Construction), and Strategy and Finance Systems (Finance, Information Management Systems, Human Resources, and Cost Control Management). This restructuring has immediately begun to break down traditional communication barriers and organizational silos, actions essential to successful reengineering. As the process evolved, cross-functional teams were also established.

Reengineering is having an effect now and will continue with NSSN. Reengineering efforts are focused on achieving affordability by reducing all costs. Indirect Costs, those general costs of doing business which are not directly related to a specific product, are being aggressively reduced across the company. Reductions in Direct Costs, the labor and material used to design and build the product, are being managed through a top down management assault, reengineering and productivity teams, and a careful monitoring of labor mix across all programs.

As part of Electric Boat's reengineering, all overhead costs have been structured into six categories based on the management actions required to address them. These cost categories are: corporate allocations, footprint (facilities), general spending, self-insurance, benefits, and overhead people. Each of these categories was analyzed in detail, to determine fixed and variable cost, and aggressive financial targets have been set to meet 1998 low rate production goals.

As the process evolved, additional teams were formed to pursue key cost reduction initiatives. For example, the "extended enterprise" team has taken Electric Boat's vision for affordability and productivity requirements to our suppliers. The facilities team is driving out the cost of facilities, within the framework of remaining a fully capable shipyard and preserving key capabilities at both Quonset Point and Groton. Productivity teams are also in place including Design/Build, Engineering Best Practices, Systems, and Management and Control. All aimed at driving out the cost of producing nuclear submarines.



Through reengineering, key business processes are being evaluated and redesigned to achieve maximum efficiency at the lowest cost. Low-value added activities are being reduced or eliminated. High-value activities and capabilities are being enhanced and broadened. Remaining activities are being streamlined to save time and cost.

Major structural and organizational changes have been initiated. Traditional functional areas of responsibility have been consolidated and spans of control and responsibility are being increased.

Levels of property, plant and equipment are being reduced. To date, Electric Boat has ceased operations at two major remote facilities. Both of these sites, along with a 200 acre waterfront property on the Thames River in Waterford, Connecticut have been sold. Excess equipment is being surplused as soon as possible; long standing lease agreements being reduced or terminated; older buildings are being razed; and, where feasible, access will be restricted in areas where future activity is low-use.

To date, Electric Boat's reengineering efforts have resulted in the elimination of over $600 million in overhead costs from the business plan from 1994–2001. Continuing these efforts, the Division fully expects to achieve its goal to cut an additional $150 million in cost over this period. These cost savings are being realized on work currently under contract and will reduce the cost of all future work as well. Additionally, it is most important to note, that approximately 95% of these savings will accrue to the Government, resulting in the delivery of more affordable ships.

Overall, Electric Boat's vision has remained firm, providing much needed stability and continuity amid rapid change. Some modifications to implementation have been made, some necessitated as a result of reengineering, others brought about by market changes.

Our results clearly demonstrate Electric Boat's determination to meet the demands of the Navy and the Congress to provide quality products at an affordable price.

VIII. CONCLUSION

In summary I would like to stress three issues:

1. Electric Boat is committed to remaining the premier resource for nuclear submarine design and construction technology. Our Program Performance and Reengineering initiatives demonstrate our commitment to affordability and excellence.

2. The current Navy/DoD plan is the right course to follow. It ensures a viable nuclear submarine industrial base is preserved and an affordable and capable submarine is ready for future force level requirements. The FY96 funding request for SSN23 and NSSN is crucial to implementing this plan.

3. The funding decisions you make this year will be the most important ones you will ever make for the future of the nation's nuclear submarine programs, and perhaps the most important decisions ever made for the future of nuclear shipbuilding.

In making those decisions I request that you keep in mind two quotes. Think of them as additional "lessons learned". ADM Rickover's words from 1979 are hauntingly appropriate today. Testifying before this committee, he said,

> *"I have said many times before, in peacetime we should build the best and most capable weapon systems we can. In past wars, we have had the time to build additional weapons to make up for our shortsighted peacetime building rates. In a future wartime situation there will not be adequate time to build the complex ships which are the product of today's technology. The judgment as to what and how many ships we should build in peacetime is obviously a question involving many elements, not the least being how much money the Administration and Congress are willing to provide in competition with other national programs. <u>But to build less capable submarines in peacetime would be a grievous error.</u>"*

ADM H. G. Rickover, September 1979
before the House Armed Services Committee

As a bookend to the previous quote, please consider what Mr. Norman Augustine, Martin Marietta Chairman and CEO, recently stated to this same committee:

> *"One of the complicating factors in defense budgetary planning is that the time horizons are so distant. It is useful to recall that the systems that performed so well in the Persian Gulf largely represented the technology of the 1960s, the development of the 1970s, and the production of the 1980s — all utilized by the people of the 1990s. That is, decisions made in the 1970s to a considerable extent determined the casualties suffered in the Persian Gulf. Similarly, the decisions we make today will to a considerable extent determine the casualties we will suffer in carrying out our national security objectives in the early part of the next century. This is a very great responsibility for each of us."*
>
> N. Augustine, January 1995
> Statement to the House National Security Committee

Thank you for this opportunity to present my views.

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Mr. HUNTER. Mr. Turner, thank you for your statement. Let me just ask you one question before we go to Mr. Fricks because you talked about this with me earlier.

You mentioned that if the Navy would streamline and reform some of its procurement practices with respect to submarine construction you could save an excess of 10-percent-per-boat. That is pretty attractive.

Is that still your position?

Mr. TURNER. May I amplify just slightly?

Mr. HUNTER. Yes.

Mr. TURNER. In answer to that situation we have, as I noted, already begun working with the Navy. The new attack submarine has some acquisition improvement or reform, if you will, already embodied in it. There are more things that we can do by working together.

I mentioned also that the lessons that we have learned—are learning—with *Seawolf* could be incorporated in and go further. Yes, I feel that additional savings in the order of magnitude which you have referred, which we discussed separately, are in order. Yes, sir.

Mr. HUNTER. Just to follow up on that. Would you folks be in a position to actually get to the point where you could put into contractual language that if the U.S. Government, if we did certain streamlining and reforms with respect to our interaction with you, that would translate into dollars and cents in reduction costs?

Mr. TURNER. The more that is done in this area would provide the opportunity for more simple contracting and gain the benefit that you referred to Mr. Chairman.

Mr. HUNTER. Could we actually manifest that in a contract where you could say, if you will do these six things, U.S. Government, U.S. Navy, we will reduce costs x dollars?

Mr. TURNER. Yes, sir. It is a process. With each change you can get improvements and go forward. As they are defined and agreed upon as spelled out, we will be glad to enter into a contract arrangement for that kind of thing, yes, sir.

Mr. HUNTER. Thank you.

Mr. Fricks, turning to you, sir. You have head the state of play that exist, the status quo, the position of the administration, the position of the Navy.

The question goes to you, sir, why should we open this thing up? We thank you for being with us. I have seen some numbers in the past where you thought we could save some very substantial amounts of money and do this thing effectively. We look forward to hearing your argument. Go right ahead, sir.

STATEMENT OF W.P. "BILL" FRICKS, PRESIDENT, NEWPORT NEWS SHIPBUILDING

Mr. FRICKS. Thank you, Mr. Chairman and distinguished members of this subcommittee. I am accompanied today by Pat Phillips, our Chairman of Newport News.

I am going to go through as the others have done and try to summarize my formal statement which you have indicated has already been accepted.

The first thing I think I should note is that Newport News can easily fulfill all of the Navy's future requirements for submarines, as has already been testified. Newport News is the best submarine builder in the world. We have been building submarines for 40 years.

We have the capacity to build four submarines per year. We are the lead design yard for the *Los Angeles* class and the *Seawolf* class submarines. By the year 2000, every attack submarine in the U.S. Navy will have been designed by Newport News.

I have no compunctions in telling you that we can fulfill probably two or three times what the Navy needs in terms of submarines. The next point I want to make is that we are here to support the Navy in its efforts to fund and build the new attack submarine.

It is very apparent to us and I think to you today probably, the Navy is correct in its view that the new attack submarine must begin construction by fiscal year 1998. However, what is equally important is that this nation must have a plan to build an affordable submarine. It is my view that while the new attack submarine is needed, the current plan for effectively eliminating Newport News as a supplier of submarines and building them only at Electric Boat, at the rate of one half per submarine per year over the next 6 years, is simply not affordable.

The plan is flawed by the simple economics of shipbuilding. Decreasing shipbuilding backlogs place tremendous pressure on the ability of the yard to distribute the inherent fixed cost of construction, both in terms of facilities and people without substantially increasing the indirect cost per vessel.

A shipyard simply must maintain a high enough volume of work to be cost competitive and efficient. Nuclear submarines simply cannot be built at an affordable price at any yard at these projected low rates unless that yard has other significant work to absorb the fixed cost.

This is true whether or not you have design teams or what you do. It is the simple economics of shipbuilding. A building rate of a half a submarine per year means you deliver a submarine every 2 years. When you do that what happens with the certified welders, what happens to the test personnel when they complete their work and must wait 1 to 2 years before the next ship? Who pays for this inefficiency?

Newport News believes it can save the U.S. Government approximately $2 billion in the Navy's funding plans over the next 6 years. We think that is a conservative number. From what I have heard today, it probably is. We can do this by spreading the fixed costs associated with shipbuilding over a much larger volume of work and by more efficiently utilizing skill trade and engineering talent.

How is Newport News able to save the government the $2 billion I talked about? The answer is simple. By attracting enough work to generate enough volume to permit the fixed cost of shipbuilding to be spread over a large number of ships and to provide for efficient utilization of manpower.

Newport News is doing this by entering the international commercial marketplace; one of the most competitive marketplaces in the world. We are the only U.S. shipyard that is able to do that. We are entering the foreign military sales market, commercial ship

repair, Navy surface ship repair, as well as our traditional business of nuclear shipbuilding and overhaul.

We are currently investing over $100 million capital and taking the risk to have the volume to provide all of our customers competitive prices for their products. We are marching forward to develop state-of-the-art robotics process lanes. We are dramatically reducing our cost to produce ships, both naval and commercial.

The decision on where to build future submarines I think is an extraordinarily significant one for the U.S. Government. It constitutes a huge decision which could ultimately determine if the submarine program is even affordable. The decision whether or not to compete the new attack submarine is a momentous one. It will determine whether or not you will save billions of dollars in the cost of building submarines.

This is at a time that has been testified that the General Accounting and Congressional Budget Office's ranges from a shortfall of $65 billion to $150 billion. However, in order to ensure the savings associated with this competition, the Congress must take steps to make sure Newport News' competitive position is not eroded between now and fiscal year 1998.

These steps would include keeping active in the submarine business by permitting us to have a substantial presence in the design, repair and overhaul of submarines. The study group of this committee has already recognized Newport News' ability to fill the Navy's submarine needs.

It is stated that Newport News has the capacity to construct sufficient new attack submarines to meet the Navy's requirements. It also went on to say efficiencies, especially in overhead, will be realized by consolidation into a single yard.

Last week, the Congressional Budget Office said, consolidating submarine production in Newport News would probably lower significantly the cost of building them.

In closing, Newport News is here to urge the Congress to support the Navy in its procurement of the new attack submarine and respectfully that the government further consider Newport News' offer of a more affordable way of implementing that procurement procedure. We believe we have an enormous cost advantage over Electric Boat. We certainly welcome the competition of the new attack submarine.

Thank you.

STATEMENT OF W. P. ("BILL") FRICKS, PRESIDENT, NEWPORT NEWS SHIPBUILDING, BEFORE THE MILITARY PROCUREMENT SUBCOMMITTEE OF THE HOUSE NATIONAL SECURITY COMMITTEE; MARCH 16, 1995

Mr. Chairman and Distinguished members of the Subcommittee, good afternoon.

My name is Bill Fricks. I am President of Newport News Shipbuilding, a Tenneco Company. As you requested, I am pleased to testify on those aspects of the requirements for continued production of nuclear attack submarines which bear on Newport News Shipbuilding.

I. BACKGROUND

Mr. Chairman, Newport News Shipbuilding is proud of its considerable contributions to our nation's security for over 100 years. Newport News Shipbuilding has been in continuous operation since 1886 and is the largest, and most capable and flexible shipyard in the Western Hemisphere. It is a major national defense and economic asset, having built an impressive array of over 700 naval and commercial vessels.

Newport News Shipbuilding considers itself to be the best submarine builder in the world -- both in terms of cost and quality.

We have been building nuclear submarines for almost 40 years. Today we are the builder of nuclear powered aircraft carriers and, with our competitor in Connecticut, one of two shipyards currently building nuclear submarines. Newport News has the capacity to build 3-4 submarines per year, which is obviously far in excess of any projected build rate.

We are the lead design yard for the LOS ANGELES and SEAWOLF Class attack submarines and by the year 2000 every attack submarine in the U.S. Navy fleet will have been designed by NNS. We have constructed 40% of today's attack submarine fleet. We also have extensive experience overhauling and refueling nuclear submarines.

Again, I believe Newport News Shipbuilding is the best, most cost effective submarine builder and designer in the world.

II. The U.S. Navy is Correct in Building the New Attack Submarine

Our first purpose in being here today is to support the Navy in its efforts to fund and build the New Attack Submarine (NSSN). Our submarine fleet will be aging fast through the first quarter of the next century and will have to be replaced. And, there certainly appears to be a multiplicity of future roles for the submarine, whatever version of the various projected threat scenarios eventually materializes. Finally, all observers seem to be in agreement that the submarine industrial base is unique, both at the prime and subcontractor level, and that it would be very difficult and expensive to restore if lost. Having considered the foregoing, it seems very apparent that the Navy is correct in it's view that the New Attack Submarine must begin construction by FY '98. However, what is equally important is that the Nation must have a plan to build an affordable New Attack Submarine.

III. The New Attack Submarine Must Be Affordable

My view is that while the New Attack Submarine is needed, the current plan for effectively eliminating Newport News as a supplier of submarines and building them only at

Electric Boat at the rate of 1/2 a submarine per year over the next six years is simply not affordable. This plan is flawed by the simple economics of shipbuilding. Decreasing Navy shipbuilding backlogs place tremendous pressure on the abilities of yards to distribute the inherent fixed costs of construction -- both in facilities and people -- without substantial increases in indirect costs per vessel.

A shipyard must maintain a high enough volume of work to be cost competitive and efficient. Low volume production has proven to be very costly in less complex products like commercial ships, but even more so in the higher cost nuclear shipbuilding sector. Nuclear submarines simply cannot be built at affordable prices in <u>any</u> yard at these projected low rates unless the yard also has significant other work to absorb the fixed overhead costs.

In addition, building at such low volumes at a shipyard which has no other work has a very negative effect on the productivity of the skill trades and test personnel. For example, a building rate of 1/2 submarine per year means you deliver a submarine every two years. What happens with certified welders or test personnel when they complete their work and must wait 1 - 2 years for the next ship? Who pays for this inefficiency?

Newport News Shipbuilding believes that it can save the U.S. Government approximately $2 billion in the Navy's funding plans over the next six years. We can do this by:

- Spreading the fixed overhead costs associated with shipbuilding over a much larger volume of work, and

- By more efficiently utilizing skill trades and engineering talent.

How is Newport News Shipbuilding able to save the government the $2 billion I mentioned previously? The answer is simple -- by attracting enough work to generate sufficient volume to permit the fixed cost of shipbuilding to be spread over a large number of ships and to provide for the efficient utilization of manpower. Newport News is doing this by entering the international commercial marketplace; the foreign military sales market; commercial ship repair; and naval surface ship repair, as well as our traditional business of nuclear shipbuilding and overhaul. We are currently investing over $100 million in capital and taking the risks to ensure we have the volume to provide all of our customers competitive prices for their products. We are marching forward in developing state-of-the-art robotics process lanes

and we are dramatically reducing our cost to produce ships -- both naval and commercial.

IV. Summary

The decision on where to build future submarines is an extraordinarily significant one for the U.S. Government. It constitutes a huge business decision which could ultimately determine if the submarine program can be an affordable weapon system and not dramatically impact the Navy's SCN accounts in the future. The decision whether or not to compete the New Attack Submarine is a momentous one; it will determine whether or not you will save billions of dollars in the cost of building submarines. This is at a time when the estimated five-year defense budget shortfall by the General Accounting Office and the Congressional Budget Office ranges from $65 to $150 billion. In order to ensure the savings associated with this competition, the Congress must take steps to make sure NNS' competitive position is not eroded between now and FY '98. These steps would include keeping NNS active in the submarine business by permitting us to have a substantial presence in the design, repair, and overhaul of submarines, work that we have traditionally done. The Submarine Study Group of this

Committee has already recognized NNS' ability to fulfill the Navy's submarine needs and the associated savings with this

plan. The Committee stated[1]:

(1) "NNS has the capacity to construct sufficient new attack submarines (NAS) at production rates sufficient to meet the Navy's requirement for new construction..."

(2) "Efficiencies especially in overhead will be realized by consolidation to a single yard..."

Lastly, in a report issued this week the Congressional Budget Office said[2]:

> "Consolidating submarine production at Newport News -- the Country's largest private shipyard -- would probably lower costs significantly...."

In closing, Newport News Shipbuilding is here to urge the Congress to support the Navy on its procurement of a new class of attack submarines, but also to suggest

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[1] A Review of the Navy's Submarine Development and Construction Program, HASC Submarine Study Group, December 20, 1994 working draft.

[2] Reducing the Deficit: Spending and Revenue Options, February 1995.

respectfully that the Government further consider Newport News Shipbuilding's offer of a more affordable way of implementing that procurement decision, and that we be allowed to compete for the business.

Mr. HUNTER. Thank you very much, Mr. Fricks.

Now, I think we will go to some questions. What I would like to do if you, Mr. Turner and Mr. O'Rourke could move over a little bit, we will have Nora Slatkin come back up. Secretary Slatkin, if you could participate, you may have a point where you want to jump into this discussion.

Let me just start off, Mr. O'Rourke and Mr. Davis with Mr. Fricks' statement that you can save up to $2 billion and ask you, does that sound reasonable?

Mr. O'ROURKE. Would you like for me to respond first?

Mr. HUNTER. Yes, sir, Mr. O'Rourke, why don't you respond first and then Mr. Davis if you have any follow-up.

Mr. O'ROURKE. The subject of fixed overhead costs is one on which we don't have all that much good information in the open domain. The statement that you heard from Mr. Fricks just a moment ago is the first that I am aware of since a prior statement that Newport News made in giving an estimate at a press conference almost 2 years ago in June 1993.

It is the kind of thing that I think we need to analyze. There certainly is a general economic theory that suggests that this kind of economy might be achieved, but you also have to look at the structure of overhead costs and at the steps that are taken by the shipyards to reduce them.

It is not axiomatic that these kinds of savings can take place or will take place, but it is plausible. In other words, I think in the figures that Mr. Fricks has given us just now, what he has done is opened up a discussion that needs to be extended and made more thorough so that we can actually understand what these figures are in a more full manner.

Mr. HUNTER. Mr. Davis, any comments?

Mr. DAVIS. I would just say that I think it is clear that if they got extra work down there, the base that they have, the business base down there, that they could—the way they could allocate costs could possibly drive down costs. I can't say whether the numbers, $2 billion or what, until we see how that figure was developed.

Mr. HUNTER. Ms. Slatkin.

Ms. SLATKIN. Mr. Chairman, I would like to comment on that statement.

Mr. HUNTER. Certainly, go right ahead.

Ms. SLATKIN. Frankly, we spend a lot of time looking at all of the options as I said during my statement. As I heard what the gentleman said, he said he could save us $2 billion over 6 years; correct?

Mr. FRICKS. That's correct.

Ms. SLATKIN. If you look at the Navy plan, over 6 years we are building, we plan if you support it, two submarines over that 6 years, the first and second new attack submarine, as well as *Seawolf*; three submarines total. All of this discussion about overheard might occur at a much later date.

When you are talking about the first and second submarine, it is hard to understand how a $2 billion savings will occur. That's my first point.

Mr. FRICKS. Let me hold you up on that point. That is because you are only going to be building three subs in the next 6 years.

Mr. HUNTER. Mr. Fricks, your response to that.

Mr. FRICKS. We don't have any problems with producing our data to show this. I think it is just an obvious answer. It is comparative data with Newport News versus Electric Boat, with EB only producing a half a submarine a year, I think it is almost self-evident. We have certainly provided to back that $2 billion up.

Mr. HUNTER. You think you can do that with the schedule that Secretary Slatkin—the schedule for production that Secretary Slatkin has laid out?

Mr. FRICKS. Yes, building one every other year beginning in fiscal year 1998.

Ms. SLATKIN. But he said $2 billion over the next 6 years. I just want to be clear on that point.

Mr. HUNTER. Did you, Mr. Fricks? Did you have a follow-up there? Let's iron this point out here. Go ahead, Mr. Fricks.

Mr. FRICKS. We didn't talk about the SSN–23. We are talking about the new attack submarine which would begin in fiscal year 1998 and go forward from there. So, there are really four submarines.

Mr. BATEMAN. Might I clarify something here?

Mr. HUNTER. Yes.

Mr. BATEMAN. Am I correct that the $2 billion savings is not $2 billion in 2 years, 3 years? It is $2 billion over the construction of the first *x*-number of the new attack submarines.

Mr. FRICKS. That's correct.

Ms. SLATKIN. But I think it also assumes, Mr. Chairman, that we don't build the *Seawolf*. That is the only way that I can see how the numbers add up.

Mr. FRICKS. No; my numbers do not include anything for not building the SSN–23.

Mr. HUNTER. So, you are talking about the new attack submarine.

Mr. FRICKS. I'm talking about the new attack submarine only.

Ms. HUNTER. OK.

Ms. SLATKIN. My second point, Mr. Chairman.

Mr. HUNTER. OK, yes.

Ms. SLATKIN. Were we to stop now and change our design practices which is what is being proposed and continue to look at a competition on the lead ship which I believe is being proposed. I haven't seen all of the details, so I feel like I am riding a little bit out there on my own because no one has provided me the details of this.

If we were to stop what we are doing now, change the way we are doing business to include both yards in the design, there would be a cost in terms of money and a cost in terms of time. That cost in terms of money could be anywhere on the order of $250 million on up.

None of us have done a careful look at what he has just said, since I am only hearing it for the first time today. There will be a cost in terms of money to stop now and a cost in terms of time because we would fundamentally have to change the way we are designing the submarine.

Our estimate, just sitting here, in terms of changing our design is anywhere from $200 to $400 million additional on the cost to de-

velop the submarine. We built in efficiencies, as Jim Turner pointed out, from using one source early on. So, that we would have to come back and say that's an added cost; to change the way we are doing business, to put both participants in.

In terms of not only added cost, but then added time. We would have to stop what we are doing, start again, and that would add us time. Depending on what you do on *Seawolf*, that could be anywhere from 2 to 4 years of added time in terms of the time we would come back for the first submarine.

Mr. HUNTER. OK. Thank you, Secretary Slatkin. Mr. O'Rourke, do you agree with that basic, what I would call a very, quick analysis that it would cost $200 to $300 million more in terms of redesign, moneys in pulling efficiencies and the delay that the Secretary spoke of.

Mr. O'ROURKE. I agree that those figures are plausible. I cannot say for certain that it would fall exactly in that range, but yes, if you are going to pay engineers to back features out of a design that they have spent putting into the design over the last couple of years, yes, it could take as much as a couple of years to pull those features out.

Engineering time costs money. It could run into the low hundreds of millions of dollars.

Mr. HUNTER. Mr. Fricks, any final remarks on that point?

Mr. FRICKS. My only thought on that is we think that the idea of designing for one yard and the costs associated with that is grossly overstated. With today's technology, when we designed the *Seawolf,* we designed it to be built at both yards, both Newport and EB.

We have the technology today to put into the product model that builds these ships the manufacturing capabilities of both yards. To think that it would cost this much money in 2 years to do it is just somewhat foreign to me.

Mr. HUNTER. Let me ask you one last question and then I want to turn to Mr. Skelton. Mr. Frisk, just a general policy question; our policy of course here is to get the most efficient system possible for the taxpayers and to meet our security requirements.

Inherent in that and one part of our concern is to be fair and equitable with the industrial base. That argument is always in there when we are talking about competition and selection, et cetera.

You pointed out that you have, because of your scope situation with respect to the work that you have, the other work that you have and the robustness of your yard in other areas, you have certain efficiencies that a yard that only builds submarines like Electric Boat cannot achieve.

Because of this work that you presently have, the carrier, I think is the big pole in that tent. You are going to be able to save some money. From an equitable policy point of view, my question to you is obviously you have got the carrier because you are the only carrier yard.

The Government at one point made the decision to give you sole source on carriers. Would it be fair to say that your argument is that you have got sole source on carriers and you are using the efficiencies that, that has given you to argue that now you want to get

into competition with somebody that didn't get sole source on carriers?

In other words, are you using a government benefit, the sole source on carriers, to leverage into a competition? It is just a little question.

Mr. FRISK. I think my answer to that is partly. If I only had the carrier, I wouldn't be able to achieve these kinds of savings. I am going out with my own money and getting commercial work. As I said earlier, that is the toughest business that there is.

Mr. HUNTER. You have gotten quite a bit of commercial work in recent years, as I understand it.

Mr. FRISK. Well, within the last year. That's correct.

Mr. BATEMAN. Mr. Chairman, might I comment very briefly on that?

Mr. HUNTER. Yes. The gentleman is recognized.

Mr. BATEMAN. Newport News is the only yard in the country capable of building nuclear powered aircraft carriers because the U.S. Navy asked it to develop the capability to build those aircraft carriers and no one else was willing to make the investment and to do what Newport News in fact did. They ought to be commended for it. They ought to be rewarded for it.

Mr. HUNTER. I thank the gentleman. I thank him for his great support of a wonderful shipbuilding yard. Nonetheless, I think that it is true that you are the only folks building carriers. That does put you in an advantageous position with respect to further construction, not necessarily bad for the taxpayers, yet a consideration that we have to be involved in. Mr. Skelton.

Mr. BATEMAN. Mr. Chairman, before you go to Mr. Skelton, is there an order that you could let us know who is in line to ask questions please?

Mr. HUNTER. Certainly; Mr. Skelton, Mr. Dellums, Mr. Sisisky, Mr. Bateman and——

Mr. BATEMAN. I'll be patient.

Mr. HUNTER. We will be in Hawaii sooner than you think.

Mr. BATEMAN. Mr. Chairman, I will yield my time to Mr. Abercrombie. I am not a member of the committee and I certainly defer to him.

Mr. HUNTER. You are not a member of the committee and you have gotten all of these questions in, Mr. Bateman. I'm shocked.

Here is Mr. Skelton, a member of the committee and a ranking member on Procurement. The man from Missouri is recognized.

Mr. SKELTON. Since the shipbuilding yard at Lexington, MO, on the Missouri River lost out early on, I have no dog in this fight. Let's strip it all away and erase all of this stuff I have been listening to. This country boy is having a hard time following all of these if's, and's and but's.

Let me ask Mr. O'Rourke and Mr. Davis, what is the most efficient and cost effective way to procure the Department's goal for its submarines? Mr. O'Rourke and Mr. Davis.

Mr. O'ROURKE. My answer harkens back to what Mr. Kennedy said earlier which is I think we know the nature of the issue. I don't think that we are in a position where we have enough information to give an honest or full and well-founded answer to that

question. We have some figures now emerging into the open domain, but they are very few.

There is a question of apples and oranges. I think we need to know a lot more before we can be confident about what the answer to that question is. We have been in that position now for some number of years.

If it turned out that we would have full information, as a matter of policy, CRS cannot make a policy recommendation. I do not have to even be in that difficult position because, as I view it, we don't know enough about the numbers and the costs to be able to make a confident statement one way or the other.

Mr. SKELTON. Would you be kind enough to list, either now or for the record, what you would need in order to answer my question fully?

Mr. O'ROURKE. I would be happy to.

Mr. SKELTON. Thank you. Mr. Davis.

Mr. DAVIS. I think we need to put a couple of things on the table. First of all, the Secretary has testified that we don't need the 23d *Seawolf*, the SSN–23, for either force structure purposes or for threat purposes in order to meet the goal of 10 to 12 *Seawolf* quiet submarines.

So, the issue becomes one of industrial base. When you go back to what the Bottom-Up Review did, they came up with an assessment. They judged that it would be more cost effective, monies could be saved, if the work could be done at Newport News versus the second yard.

As I pointed out earlier, I haven't had an opportunity to assess the information that was provided by Newport News today, so I can't really attest to that data. I think the real question becomes one of a policy choice of do we want one yard or two yards and has the Department sufficiently justified that in terms of their positions of explaining to the decision-makers?

Mr. SKELTON. Thank you so much.

Mr. HUNTER. Thank you. Mr. Sisisky.

Mr. SISISKY. Thank you, Mr. Chairman.

Mr. Kennedy really asked the right question before. I join him in requesting an analysis for really the cost of one yard versus two yards.

Now, I am wise enough and old enough now and so are you, Admiral Demars, to know that logic doesn't play a hand in some of the decisions that we really make. I only singled you out because I was looking at your eyes.

We talk about fixed costs and all of these other things. It is just common sense. Let me tell you, and I haven't made up my mind about SSN–23, to be honest with you. Let me tell you what my worry is. It has something to do with this whole question. I may be wrong, but I remember that last the conferees on the Defense Appropriations Act expressed gross concern about the cost, design and schedule of the new attack submarine.

If Congress were to choose to delay production of a new attack submarine to 2000, you know we are looking at *Seawolf*, SSN–24. So you are not just talking about 23 now. You are talking about 24 to make the bridge. That is what this argument is all about. Can we afford the cost?

We know how some of these decisions were made. I am not blaming anybody for decisions, and I am not inferring anything, but you know that the decisions weren't always made directly by the Navy without—you know, I'll just lay it on the table, but it happens.

All I ask that, again, I come back to Congressman Kennedy, that an analysis of this be made. Let me ask another question. When I first saw this, it was not in your testimony, Madam Secretary, but in the budget submission that Electric Boat would be the sole source, one yard. Were any committees of Congress, and I am really asking because I don't know. I know I play a part in this committee, but were any committees of Congress briefed about these decisions prior to being made? If not, why not? When and on what basis was the sole source decision made within the Pentagon to award this program to Electric Boat without competition?

While I am talking about that, let's talk a minute about the cost of 21 because Mr. Turner mentioned it. Are you going to be within the cap?

Ms. SLATKIN. Yes.

Mr. SISISKY. Do you have any overhead charge to 23 in that cap? Do you follow what I am saying?

Ms. SLATKIN. Yes.

Mr. SISISKY. Because I think that is an important issue that we have to decide because you are going to hear, Mr. Chairman, all kinds of testimony that if we do not deliver 23, and that's what is bothering me now, that we would have an enormous cost in not doing it. Of course you could add that for 24.

I asked those questions. You said that we will meet the cap. I am anxious to seeing that we do. You say you are going to meet it on schedule. I am going to come visit you to look at that wonderful fighting machine and try to be as nice as I can about that. If you would like to answer any of the questions, go right ahead.

Ms. SLATKIN. Mr. Sisisky, were you asking me the questions? I would be happy to go through each one of them if you like. You first issue or your first question about analysis of one yard versus two, that Congressman Kennedy raised.

I think it is important that we be clear about what needs to be in that kind of an analysis. As I tried to explain to the committee, this is not just about submarines. This about nuclear shipyards and nuclear shipbuilding. That is not just submarines and carriers. That is submarines, carriers and carrier overhauls.

Mr. SISISKY. Madam Secretary.

Ms. SLATKIN. Yes, sir?

Mr. SISISKY. Nothing; go ahead.

Ms. SLATKIN. Just to correct something that was said up here earlier by one of the other witnesses, yes, it is true that Newport News is the only shipyard capable of building carriers and we are quite proud of that. As Mr. Bateman said, we have been getting a good product.

We have policy in the Navy of directing our overhauls, our carrier overhauls there. So, we have had a delivery policy in the Navy where we do have a capacity elsewhere. I am not suggesting that I want to change that policy. I want to be clear that this isn't the first time we have used this mechanism in terms of industrial policy.

We have been doing it with carrier overhauls. They go to Newport News. So, that's first. In terms of an analysis, one of the things that I would like to say to the committee in response is, yes, we ought to lay that out carefully. There is another piece in the mix. As I said, we are talking about more than submarines.

We need to make a decision when we look at maintaining two yards. That also includes a decision about the follow-on carrier; what it looks like, when it is and when we buy it. That is all a part of the mix of what our maintaining two yards is all about. I think we would be—if that is what the committee would like, an analysis——

Mr. SISISKY. What does that have to do, what does the design and the carrier have to do with the submarine? Please tell me.

Ms. SLATKIN. Our policy is the maintenance of two nuclear capable shipyards. As I said earlier——

Mr. SISISKY. Even without the affordability?

This committee and the Congress is the one that decides the affordability and the money. Even without the affordability, that decision has been made? That is why I said we ought to have an analysis.

I guess my problem is, and I hate to confess I have been here too long. I listen to the arguments of strategic home porting that we close all of these things now, just about, with the exception of one. The Navy gave the greatest argument that I could ever hear of why we should have them and yet we closed them.

Let's do a cost analysis. Forget about the industrial base. Reconstitution takes place in both places. When you take the engineering away from Newport News and you take the submarine repair away from Newport News, they have got a problem of reconstitution; not as critical as Electric Boat, but they do have a problem of reconstitution; do they not?

Ms. SLATKIN. And the fundamental of our policy was without maintaining two shipyards. We were concerned about the amount of time and the amount of money and our ability to ever reconstitute a second yard. That was our principal concern, the principal underlying rationale for two yards. It was our concern about our ability to reconstitute a second yard in terms of time and money.

Do you want to add anything to that?

Mr. DEMARS. Yes. Could I just say one thing please to put the two-yard argument in context somewhat? I think we are focusing excessively on whether we have one or two nuclear building yards.

In this country, we have six manufacturers of military aircraft. We have six manufacturers of major surface ships. During the height of the cold war, we had seven shipyards building nuclear submarines. Those were much less complicated submarines than we have today.

In that context, it doesn't seem unreasonable to want to maintain two yards with a nuclear capability as a hedge against the uncertainties in the future, particularly if you are not paying a significant premium for it. I think you heard Mr. Turner say that he is aggressively downsizing. He is aggressively re-engineering so that we break with some of the high rate productions of the past.

I think our analysis shows that with continuing aggressive efforts to re-engineer on the part of both shipbuilders and the Navy,

that we can keep two nuclear shipbuilders in business without paying excessively for the product.

Mr. SISISKY. Mr. Chairman, I am going to let somebody else ask questions. You know, when you talk excessively, when you talk about billions, I mean if you can believe that figure, and I don't know whether they can—but you just didn't answer one question and that had to do—I am not shouting at my friend over there. She is my dearest friend, believe it or not.

You didn't answer the question about the overhead on 21 and 22 placed on 23.

Ms. SLATKIN. First of all, let me say that we have taken a number of actions which you are aware of to ensure that 21 and 22 will come in under the cap that Congress legislated last year. We feel comfortable that we are going to be able to do that.

One of the assumptions that was put into the estimates that Congress legislated for that cost cap assumed SSN–23 and the overhead associated with SSN–23. So, if we don't build SSN–23, our estimate is the impact on existing contracts. Impact cost gross on the 21 or 22 could be anywhere from $200 million to $350 million. Now, that is just an estimate. That is essentially what you are dealing with in terms of overhead adjustment, increases in material and severance pay and retraining pay.

That is where that estimate comes from. So, you are looking at about a $200 million to $300 million increase on the cost of existing contracts on the 21 and the 22.

Mr. HUNTER. I thank the gentleman.

The ranking member of the full committee is recognized, Mr. Dellums.

Mr. DELLUMS. Thank you, Mr. Chairman.

I am going to pass because I would like to hear from other members, but before I do, I would like to first compliment you for setting up this particular hearing and structuring it this way.

Second, to say to all of us who are assembled here that none of us are naive people. This issue has incredible implications at the policy level, at the purely political level, at the economic level, industrial base considerations, strategic implications here. This is not a simple issue.

There are forces here that have incredible self-interest, Mr. Chairman, and understandably. I don't challenge that. That is the reality of the world. There are those of us like you and myself and others who, as you pointed out when I stepped out for a moment, your colloquial euphemism was, I don't have a dog in the fight." We have to stand back objectively and attempt to address this very significant and serious issue.

Today, I am in a listening mode. I am fascinated by what I am hearing. I am trying to take careful notes. I am listening very carefully. This is an issue that we are going to have to revisit. It is not all going to get solved in the context of this hearing today.

I think the people who do have a significant self-interest in this process ought to fairly have the opportunity to engage today and let everyone have their opportunity to speak today.

So, with those remarks, I would yield back. Maybe later in the process as I see how things are evolving, I may want to make a

few observations. At this point, I would like to hear from our younger colleagues.

Mr. HUNTER. I thank the gentleman.

I appreciate the ranking member's diligence with respect to the hearings that the Procurement Subcommittee has been having, not just today, but over the last several weeks.

Mr. Taylor of Mississippi is recognized.

Mr. TAYLOR. Thank you, Mr. Chairman.

I also don't have a dog in this fight. However, Ms. Slatkin if it ever gets to a point where with these two fine competitors, you just can't decide which one you would like to reward with that $1.3 billion, the Marines are in desperate need of seventh LHD. That is just about the price tag. So, King Solomon always has a third option.

Again, I appreciate the chairman having this hearing. I hope you understand that there are other needs in the industrial base as well. I yield back the balance of my time.

Mr. HUNTER. I thank the gentleman. Mr. Chambliss.

Mr. CHAMBLISS. Thank you, Mr. Chairman.

I will pass to Hawaii at this time, I believe.

Mr. HUNTER. The gentleman from Hawaii, Mr. Abercrombie.

Mr. ABERCROMBIE. Patience is its own reward.

Mr. Turner, if you please, you can do me a service as can Mr. Fricks, if you would. How many people work in your shipyard?

Mr. TURNER. There are about 15,500 today as compared to 23,000 4½ years ago.

Mr. ABERCROMBIE. Mr. Fricks, how many people work in your shipyard?

Mr. FRICKS. We have about 19,500 which is about—we had about 28,000 4½ years ago.

Mr. ABERCROMBIE. Mr. Turner, with the work you have scheduled right now, how many of those people are going to keep working?

Mr. TURNER. With the work that is now within the strategy being carried out by the U.S. Navy, we would drop to a low of about 6,000 in the 1998 timeframe. We would reduce an additional 9,500.

Mr. ABERCROMBIE. Setting aside this discussion, Mr. Fricks, how many people will you have working based on the work that is coming in to Newport News right now? Include the repair maintenance.

Mr. FRICKS. The commercial work?

Mr. ABERCROMBIE. Yes.

Mr. FRICKS. Our plans are to have about 15,000 people employed at Newport News, including our commercial work and foreign military sales and everything else we can scrape together.

Mr. ABERCROMBIE. You go from 19,500 to 15,000.

Mr. FRICKS. Approximately.

Mr. ABERCROMBIE. OK.

Within that context, Mr. Chairman, both the comments of Mr. Dellums and Mr. Taylor are important to me. We do have other, I am going to say priorities. I don't really see these in a hierarchial fashion. They are competing interests when you are dealing with

money, personnel, and mission associated with these awesome projects.

I think they are awesome. We maybe get a little blase about it in some respects because they become so familiar to us. The words and the acronyms roll off our tongues so easily. I think they are awesome.

Affordability, I think is a question. Ms. Slatkin, I would like to ask you; affordability is a question that I think arises when somebody has an interest in making a case for themselves. Otherwise, the numbers go all around. Here is a question of policy, I believe.

I take it from the testimony that you have given that, while you are not discounting affordability, you are not being cavalier about it in the least, nonetheless, would it be fair to characterize your testimony that first and foremost this committee has to decide upon a policy?

Then it has to see what kind of cost implications follow from that policy. Is that fair?

Ms. SLATKIN. Yes. That is quite fair.

Mr. ABERCROMBIE. Now, if we determine those cost implications are so outlandish or so beyond our capacity, that's one thing. But given the human dimension now, which is what I am going to focus on, somebody is going to have to talk to me pretty earnestly to get me to change my position depending on the answers that I get to the next set of questions.

If this policy of yours is followed through on, will it not have the clear implication of keeping a majority of people working in Newport News; not a majority, but at least a significant number of people will continue to work up at Electric Boat?

Ms. SLATKIN. Yes, Mr. Abercrombie, as well as the supplier base.

Mr. ABERCROMBIE. Yes, I understand. I said, there is a policy implication here that I fully understand. Then you get to the question before I—in the human dimension, and I am speaking strictly in the human dimension here because, no offense, Mr. Chairman, but I don't notice that there are any operating engineers, the unions, the shopkeepers, the people that run the lunchrooms around there, the taxi cabs, the mayors of the towns, or whatever.

We are talking about could you give me, Ms. Slatkin and perhaps both Mr. Fricks and Mr. Turner could give me, what would you say is the multiplier effect of the expenditures that are made in the area of Newport News and where Electric Boat is?

Ms. SLATKIN. Could I ask both the industrial people to start first. I haven't done an assessment.

Mr. ABERCROMBIE. Actually, you can make that for the record rather than take the time now.

[The following information was received for the record:]

The Navy does not have data on the "multiplier effect" for expenditures in Newport News, VA, and Groton, CT. The Department of Commerce, Bureau of Economic Analysis maintains a model that could generate this information.

Mr. ABERCROMBIE. I am going to guess that it is pretty considerable; right?

Ms. SLATKIN. Pretty considerable, yes.

Mr. ABERCROMBIE. In other words, both of you are a major economic, and by extension, social factor in your regions and areas; are you not?

Mr. TURNER. That is correct.

Mr. FRICKS. That's correct.

Ms. SLATKIN. Absolutely.

Mr. TURNER. We are the largest employer in the State of Rhode Island. We are the second largest employer in the State of Connecticut. We will be passed in Connecticut by someone else in the not too distant future. That is private companies, not government of course.

Mr. ABERCROMBIE. I am assuming, Mr. Fricks, that you are a major economic and social factor.

Mr. FRICKS. That would be correct. We are the largest in the Commonwealth of Virginia and certainly in our region.

Mr. ABERCROMBIE. I don't think you could say that I am being unfair because didn't you just finish a pretty big contract by working on one of the only United States-owned, United States-operated and U.S. crude cruise ships in the United States?

Mr. FRICKS. We just signed a letter of intent for a commercial tanker. That is correct.

Mr. ABERCROMBIE. You worked on our cruise ship too.

Mr. FRICKS. Which one is that?

Mr. ABERCROMBIE. The U.S.S. *Constitution*.

Mr. FRICKS. We did do that job, yes. It was a pretty small job.

Mr. ABERCROMBIE. I know there was some argument about how it got there.

Mr. FRICKS. That was one of the small jobs.

Mr. ABERCROMBIE. It was a big job for Hawaii because I think we put I think $28 million in it.

Mr. FRICKS. We haven't got that $28 million yet.

Mr. ABERCROMBIE. I know. There is some dispute. I know you want to be real nice to me.

Mr. FRICKS. If you could help me on that, I would appreciate it.

Mr. ABERCROMBIE. I certainly will. That is important to me. We may be some distance from you, but having a strong merchant marine fleet, the work that you are doing in the commercial work, I want to be helpful there.

My bottom line is this, Mr. Chairman. I think we have to have a policy question because I do not see defense, our role in the defense of the United States as necessarily being one in which competition per se is the primary goal to be achieved.

If I want to see competition, we can have a discussion on whether Michael Jordan should come back and play for the Chicago Bulls. I don't see that. I see our role as a combination of preparing this country to be able to defend itself and its interests and that of its allies in the world and to see that a human face is not lost in that process.

Human face means that we see to it that our people are taken care of. If that means dividing up work and if that means spending a little more money as a matter of fact, I have no problem whatsoever appearing in front of anybody, including my constituents or anybody else's for that matter, and justifying it on that basis.

I think it is just as much in our national security interest to see to it that our people are fairly treated across the board as opposed to merely seeing a situation of winners and losers, strictly on that point.

I will reserve my final judgment as to what should be done on this tending my being able to fully absorb all of the implications of the various technical matters that have been brought forward now as to mission and what kind of ship should be put forward.

I haven't fully absorbed that yet. I freely admit that because I can't do anything other than that and be halfway honest about. My prejudice and my bias now is to see to it that the maximum number of people are working with the broadest possible industrial base that we can have. That to me is a good definition of what affordability is if we are serious about national defense. Thank you, Mr. Chairman.

Mr. HUNTER. I thank the gentleman.

Does the gentleman from Virginia who is a guest of the committee, does he have any questions that he would like to ask?

Mr. Scott. Are there Members of the committee that haven't had an opportunity?

Mr. HUNTER. Mr. Chambliss, do you have any questions at this time?

Mr. CHAMBLISS. Mr. Chairman, I don't really have a question. It is just more of a comment. This whole process is new to me. I am somewhat fascinated by it. I can't help but be reminded about Senator Dirkson's old remark that when you get a billion dollars here and a billion dollars there, then pretty soon you have got some money.

Madam Secretary, I would hope that we don't just totally disregard Mr. Fricks' statement about the fact that he can save $2 billion over the next 6 years. I understand what Mr. Abercrombie is saying. I don't know frankly from my standpoint that it is the planned concern that we keep shipyards open out there that don't operate efficiently.

I don't in any way mean to indicate that I understand they do. I am just saying that if there is a potential for saving $2 billion, please let's don't disregard that.

Ms. SLATKIN. If I may, sir?

Mr. HUNTER. Go right ahead.

Ms. SLATKIN. We really have looked at this carefully. We believe that there is an up-front cost to anything that is different than our plan, as I said.

So, it is not just, I think the eloquent remarks of Mr. Abercrombie about an industrial base, but it is also the fact that we saw a large up-front cost of doing things any differently than what we have proposed, as well as a delay in getting a needed warship. Yes, I take your point. Anytime anyone of my suppliers can provide me a better cost, I will pay attention to that. Thank you.

Mr. HUNTER. Mr. Scott.

Mr. SCOTT. Thank you, Mr. Chairman.

Very briefly, obviously as a Representative of Virginia, I do have a dog in this fight. I would like to make comments to those who don't have a dog in the fight. That is the fact is that if we build the submarines in Newport News, obviously they can be built. They can be built well. We can spread those costs over not only government work, but nongovernment work.

There is no way that someone doing just submarines for every time you turn on a light bulb it goes into that submarine, there is

no way anybody else can compete with that. When you add on the fact that we don't have to do a third or a fourth *Seawolf*, it is obvious that there are significant savings that can accrue.

The fact is, we have to much capacity. We can build a lot more submarines than we have scheduled to be built. There is only going to be one yard that is going to end up doing it. The question is, which yard can do it best, most efficiently and cheapest.

The question of reconstituting the capability has come up. I think the single yard at Newport News, consolidated Newport News, shows that we could respond to a surge need almost as well as the two-yard capacity did.

The Bottom-Up Review says that we need to many submarines. The question is, from the taxpayer's point of view, how can it be best done? We heard if we have to redesign the work that has been done, it might cost a couple of hundred million dollars. If we have to cost shift some that have been kind of reserved to the third *Seawolf*, that might be a couple of hundred million.

The savings for not doing the *Seawolf* is a billion and a half. You have got a lot of room there in costs that would have to be incurred. Then when you add on the cost efficiencies or the fact that the fixed overhead could get spread out, I don't think there is any question that the taxpayers' interests and the public policy interest, in terms of building the submarine, it is going to be best done at Newport News.

If there are other considerations, jobs or whatever else, then put those on the table and say, it is a jobs bill. If our focus is how we can best do what the Bottom-Up Review asked us to do, then I don't think there is any question, Mr. Chairman, that the $2 billion is alive and well.

Mr. HUNTER. I thank the gentleman.

The Chair has got a couple of questions that I would like to move into at this time. I appreciate the gentleman from Virginia, the gentleman from Rhode Island and the gentleman from Virginia, Mr. Bateman, for being with us to ask those questions.

I think this has been good to get this information up and let it get kicked around a little bit. We are going to have some requests.

Mr. Fricks, what I would like you to do is to put together—you said you could document a very substantial savings. I would like you to put that together and to get it to the committee.

Mr. HUNTER. I would like Mr. Turner be given a chance to have his say with respect to whether or not the savings can be achieved; to have a chance to comment on that.

Mr. O'Rourke and Mr. Davis, we would like to get your comments on it. You said there hasn't been enough analysis. Let's get some analysis for the committee.

Admiral Demars, let me ask you a basic question here. There has been this bifurcation of the threat or of the projected submarine requirement; 45/55 Bottom-Up Review. What is it 55/67 that the JCS put out.

I have talked to submarine operators, some of the users who think that the 45/55 was an arbitrary number that was totally budget-driven. The importance in this area of undersea capability is so vital that it appears to me that this is one area where you do what you have to do.

It is interesting, as Mr. O'Rourke said, that the Soviets or the Russians have continued to focus on submarine capability. As a guy who came here with Ronald Reagan in 1980, I never thought I would be sitting in a briefing in which we would be being briefed on how American existing boats in the water were inferior in some quietness aspects to Russian boats. That was never on our chart.

It is quite remarkable that we have moved this quickly and the Russians have moved this quickly and as effectively as they have. So, my first question to you, Admiral Demars, why aren't we going with the JCS requirement?

Admiral DEMARS. That is a good question, but it is really quite simple. One is an unconstrained look at the world. The other is affordability constrained. It is no different than it was during the cold war. During the cold war, while our force level was 100 attack submarines, the JCS number varied between 125 and 140. This was unaffordable.

The rest of the Navy, the same way; a certain number of aircraft carriers, maritime patrol air wings and so on and so forth. So, that is not unusual in the way the defense department does it business. I also would like to comment on your second thing because I think it is again a largely overlooked issue here.

That is, I have been in the submarine business for a long time, about 37 years. The margin to undersea superiority today is the slimmest it has ever been. We have never had submarines that were quieter than ours at sea. Fortunately, we can hear better than them and we still have a certain measure of undersea superiority.

It is the thinnest we have ever had. Unless we move out smartly to build more capable submarines, which is the third *Seawolf,* and get on to a low rate building rate of the new SSN, we are going to loose it totally. We will make these programs so unaffordable that nobody will care about undersea superiority.

Mr. TAYLOR. Mr. Chairman.

Mr. HUNTER. Sure, Mr. Taylor.

Mr. TAYLOR. I want to open this up to the panel. I needed to have my memory refreshed that the Bush Administration had called for building one *Seawolf* and then going on to the *Centurion.* Then at some point Candidate Clinton said, well, we will build a second *Seawolf.*

Let's face it. I look at the second *Seawolf.* It is politically driven. We won't take it any farther than that. What became of the idea of going to the *Centurion*? Why does it keep getting pushed farther out?

Admiral DEMARS. The *Centurion,* the new attack submarine, is the new SSN. It is just a change in name. 1998 is the soonest we can deliver that submarine irrespective of the name. The concept has never changed. It is always the next generation of attack submarines. The name changed for reasons that escape me, quite frankly.

Mr. TAYLOR. When you say "delivered," Admiral, does that mean lay in the keel or actually delivery such as——

Admiral DEMARS. Start; authorized. This year we are asking for long lead funds in 1996. Then it will be authorized in 1998 and delivered about five years later. So, this is the soonest, from a tech-

nology standpoint we can do what we were talking about when we called it *Centurion*.

Mr. TAYLOR. Why the big delay, Admiral?

Admiral DEMARS. Because we are stretching to try and put the technology that we have developed for *Seawolf* into a smaller ship. In other words, not to spend any more money on research and development than we have to. Use the quieting techniques and so on. It is that move to get the same level of quieting in a smaller hull which has certain technical challenges to it. This is the quickest that we can bring it in.

Mr. TAYLOR. Thank you, Mr. Chairman.

Mr. HUNTER. Mr. Fricks, you at one time got a document out that says you can save $3.5 billion. When you said you can do two and you were optimistic you could do more, that may be what you are referring to? I take it that is what you are referring to today.

Do you think it is within the realm of possibility of saving $3.5 billion? How do you get there?

Mr. FRICKS. The $3.5 billion included not building the new attack submarine, I mean the 23. So, you had $2 billion plus the $1.5 billion which is budgeted for the new attack submarine.

Mr. HUNTER. OK.

Mr. FRICKS. I wasn't referring to the two as being conservative because of that reason. I just think that the two may be conservative.

Mr. HUNTER. Let me ask you, you obviously have got—you are doing submarine work now. How many folks are dedicated in your yard to submarine work?

Mr. FRICKS. We have 3,000 to 4,000 people building submarines.

Mr. HUNTER. What are they doing?

Mr. FRICKS. They are finishing up the last three submarines, 688 submarines, plus design work, plus some SRAs.

Mr. HUNTER. They phase out when?

Mr. FRICKS. The will be completed their work by the end of 1996.

Mr. HUNTER. OK. Ms. Slatkin, have you done any studies or projections on where these folks will go; this parting of the attack submarine base?

Ms. SLATKIN. Yes.

Mr. HUNTER. What are they going to do?

Ms. SLATKIN. As you heard from both shipbuilders, both yards are going to see downsizing. This is not a capacity issue. I think everyone has made that abundantly clear. So both yards will see downsizing.

The real key, and the key point I want to leave with you is, we are talking about nuclear trained workers. Those are skills that we really need to worry about bringing back. I think somebody talked about the amount of time it takes to train a nuclear skilled worker and to certify someone to work in the nuclear area. We are talking a lot longer.

Mr. HUNTER. That is one reason I asked the question. Mr. Turner, I would like your comments on this. Is this a community of nuclear trained workers who basically, as more work goes to Electric Boat or continues with Electric Boat under the present DOD scenario, will this community of workers migrate as they phase out at Newport News to the Electric Boat community? Is it your experi-

ence that they tend to dissipate to the four winds as a lot of Americans do in given industries?

Mr. TURNER. Mr. Chairman, if we take the number of persons working submarines in both yards today, and project that between now and 1998, it will continue to come down no matter what the situation.

Mr. HUNTER. I understand.

Mr. TURNER. There will not be migration of those workers to us because we have more than enough skilled persons already on board, already working. As I testified earlier, we will be reducing from 15,500 down to about 6,000, of which 3,000 of which will be hands on, blue collar workers. Most of the reduction of the 9,000 is in that area.

In any case, the migration and I can't speak for Newport News directly, but I think you asked me to comment on that. Is that correct?

Mr. HUNTER. Yes.

Mr. TURNER. As Mr. Fricks is finishing work on the submarines by 1996, they will migrate somewhere else either to build some other product that they have sold or out of the gate. Where they end up, who knows? At some future time, given the new attack submarine in 1998, they will have to be brought back in after at least, many of them, 3 or 4 years if they can still find them, out of activity in that arena. First off, we don't need to keep as many people working submarines between the two yards as we have today. There is no requirement in anybody's plan.

Mr. HUNTER. You are saying that there is going to be a hiatus in work even under the plan that Mr. Fricks laid out to save some money.

Mr. TURNER. I think I heard him say that he was going to finish at the end of 1996. If the new attack submarine is what I heard him testify earlier was what they were conserving, that is only going to get contracted for in 1998. I would suggest that at least 1 more year after it is contracted for before you start yard workers on it.

You have got to go buy the material and prepare for production, more or less plus or minus. You are looking at, by any way you stretch it, a 3-year situation. Knowing the company is not going to keep on working if they don't have something for them to do.

Mr. HUNTER. I understand that, Mr. Turner. Mr. Fricks, what do you think?

Mr. FRICKS. Well, it is clear that the total number of nuclear skilled workers is going to decline. It simply is not enough work no matter what scenario you pick that is going to keep the number of skilled workers up. What we are doing by bringing in commercial work and other work is trying to retain those skills that take literally 10, 15 years to develop and put them on work. In total, it is still going to decline.

Mr. HUNTER. My question is, do you have a hiatus between the work that you are going to finish up on that you have in your yard now under your plan and the new work that presuming you competed for and won, the new attack submarine, is there a hiatus? How long is it in your estimation?

Mr. FRICKS. The answer is yes. It is about a 2-year hiatus.

Mr. HUNTER. What do you think will happen to the work force if that occurs?

Mr. FRICKS. As we have said, we need to maintain some part of our work in the submarine business to design and to overhaul work. So, we do want to be in the submarine business during that period of time.

Mr. HUNTER. Have you done an analysis that tells you, you are basically going to have the team ready, but you will be able to retain enough of the team in this hiatus period to come in, in a robust way into the new production should you win the new attack submarine?

Mr. FRICKS. It is a matter of degree. We feel like we do need additional overhaul work and design work in order to be the competitor we want to be in fiscal year 1998.

Mr. HUNTER. Try to attach some numbers to that when you give us your analysis on how much you could save. Attach some numbers to that so we can take a look at it.

Mr. FRICKS. We will be happy to.

Mr. HUNTER. Let me just move that question. The Rand Corp. has stated that we should have spent some time looking at the feasibility of extending the service life of the 688's. I am going to number of submarines that we have got and how we can get there from here. We have apparently kind of rejected that.

Mr. O'Rourke, is that a feasible thing to do, extend 688's or are we retiring them too fast to drop down to this, what some people call, arbitrary Bottom-Up Review, 45/55 number, just so we can say we hit bottom like we have in most of our systems?

Mr. O'ROURKE. I don't know that we have rejected the option of service life extension for the 688's. We simply haven't discussed it at the hearing very much until this point. It is still possible to examine the option and see if it is technically feasible.

The Rand study said that for production rates in the range of two or three boats per year, the force level and procurement rate affects of service life extension for 688's can be quite significant in terms of relaxing your procurement requirements.

On the other hand, the Rand study also pointed out that service life extension is by no means trivial. You could go through the study and discover that no, it won't work for some reason that we are unaware of today. We don't know that it is possible.

I agree with the Rand study's characterization of service life extension as something that is not tribal. I want to make one other point. If you succeed in extending the service lives of these ships, what you will be extending are ships that have no real capacity for growth and flexibility to be used out in that time period, nor will those ships have features that optimize them for operations in littoral areas, nor will they be *Seawolf*-level quiet boats.

Service life extension, if possible can relax the numbers problem, but it does not get to the qualitative problem of putting out an attack submarine force that meets certain qualitative requirements that you might be interested in meeting, both in the near term and in the long run.

Mr. HUNTER. I think you have given a lot of Admiral Demars and Ms. Slatkin's answer to this. Mr. Davis, that takes me to you because you offered an alternative program which did include 688's.

One question that, that raises in talking with submarine drivers is these folks understand what is happening with the Russians.

They like to ride in American boats because they are the best. They hear the other guy before they get heard. There cold be a demoralizing effect, if you would, on the personnel which is one of the most critical aspects of submarine operation and submarine programs, if you are driving around in Chevys when you discover that the other guy has got the new technology. We have a problem in fielding more 688's in light of Soviet developments with respect to our personnel.

Mr. DAVIS. One of the alternatives we looked at was extending the life nine of the 688's. Even when you do that, it still gives you the force structure that the DOD says they need. It also gives you the capabilities that DOD says they need.

In other words what I am saying is, you can do that and you can still have the numbers of *Seawolf* quiet submarines that the Navy says they need in the time frame in which they said.

Also, I think as Admiral Demars said, while clearly it has been advances in quietness with the Russians, I think Admiral Demars said the margin might be less than it has been in the pass. I don't think anyone is questioning right now whether or not we still have a tactical advantage.

Mr. SKELTON. Mr. Chairman?

Mr. HUNTER. Thank you. Admiral Demars, a quick word on this and then we will move to another question.

Admiral DEMARS. I would say that I am questioning whether in certain scenarios we do have a tactical advantage.

Mr. HUNTER. Pull the mike up there. I can't hear you, Admiral Demars.

Admiral DEMARS. I do question whether in certain scenarios in very quiet waters we do have a tactical advantage. This is not the forum to get into that. I would beg to differ with Mr. Davis there. I get all of the intelligence briefs.

I think I found some common ground with Mr. O'Rourke here today on what he said in answer to extending the 688's. In fact you can do just about anything with time and money in this business. We could extend it. We could move the service life on out, but you would be left with an obsolete submarine that just fills a number and doesn't really meet a war fighting requirement.

In the process of doing that, what have you done? You have forestalled building the new submarine. Your design base goes away and so does your building base.

Mr. HUNTER. Why did Rand recommend that, that at least be pursued?

Admiral DEMARS. They just recommended studying it. Those companies like to study things. It was an open hole that hadn't been studied in detail. Quite frankly you could study it. We are looking very hard at trying to take the *Trident* submarines from 30 years to 40 years because they operate under much less demanding circumstances. They get much better phase maintenance.

It makes sense. They are working very hard on that. That is going to take us about 8 years to technically come through that. When we talk about extending service life, we do it after an engi-

neering study and judgments for the safety and reliability of the reactor plant and the rest of the submarine.

So, it is something we are trying to come through now on the Tridents in order to save money in that area for the country.

Mr. HUNTER. Okay. Mr. Turner, could you put together for the committee an analysis of the impact on your work force, your yard and what you think the cost to the government would be of a competition? You might go both ways with that, if you win the competition or if you lost the competition.

I think that is one of the things that we are going to have to look at here to have what Mr. O'Rourke calls a full picture. Could you do that?

Mr. TURNER. Yes, sir, Mr. Chairman. We will work with Mr. Thompson to be sure that we get this in the proper form for your utilization.

Mr. HUNTER. OK. That would be a winner-take-all type of a competition. Mr. O'Rourke, you said that you need about almost 6 submarines, about 5.7 submarines for 1 in the water on station. Is that accurate?

Mr. O'ROURKE. That is the figure that the Navy gave me when I was developing the report on Naval forward deployments. That came out in late 1992.

Mr. HUNTER. Since you said that, we have Admiral Demars sitting next to you. My question is this. I understand, you know, coming from a ship repair town, we have had some tired old fellows and then we have had some real new ships that have not had to be repaired a lot.

If you take a new ship, let's say the 23 off the line, 22 or 23 off the line, and put it into the water, does that give you a higher—if you had say 6—instead of 6 boats that were out of the average cut of the fleet right now, you took six new 23's. Does that give you more time on station? Does that cut that ratio, Admiral Demars?

Admiral DEMARS. Yes, sir, it does to a degree. I think the numbers are like four or five. I just asked somebody who is more expert in that who is behind me here.

Mr. HUNTER. Now, you understand my question?

Admiral DEMARS. Yes, sir, I do.

Mr. HUNTER. You said it cuts it to four to five if we have newer ships?

Admiral DEMARS. It cuts it somewhat. In other words, you can transit at a higher speed more quietly. You can go faster to get where you have to go. Still, one submarine can only be in one place at one time. It is not a direct mathematical affect. More capable submarines can do a better job, fill more of the countries needs than less capable ones.

Mr. HUNTER. But also newer submarines are going to spend less time in the shop; right?

Admiral DEMARS. Because of the way we are designing it, we are attempting to reduce the amount of time that they spend in the major industrial overhauls. The *Seawolf,* although it is not designed that way, we feel with our conservatism, will end up with a reactor that lasts the life of the ship.

We will not have to be refueled. That is a major off-line time. In fact, the newer submarines, the *Seawolf* and the new SSN's will

have more effective time in operations and less in maintenance and refueling.

Mr. HUNTER. Was there a reason not to have Newport News involved at all in the design of the new attack submarine? Was that simply because they aren't building it? Wouldn't it be prudent to have them at least in the loop?

Admiral DEMARS. They were in the loop to a degree. They did have tasks to do in support of the new SSN. It was in the nature of trying to focus and do things in a much more efficient way which you can do when dealing with a single yard than with two yards. We have proved that with *Seawolf*. We spent much more money and effort building, designing *Seawolf* at two different yards.

Mr. HUNTER. How many folks do you keep in the yard? That is the last question that I am going to ask then I am going to go to the ranking member of the full committee, Mr. Dellums, and then Mr. Kennedy. How many folks do you keep at the yard? How many uniformed personnel are at EB?

Admiral DEMARS. The supervisor of shipbuilding is a couple of hundred I guess. I have about five people there that look after things in my area.

Mr. HUNTER. Do you agree that the Navy could be a better customer, a more streamlined customer with respect to building these submarines?

Admiral DEMARS. Yes. We are actively working on that today and have been for over a year.

Mr. HUNTER. Mr. Dellums is recognized. Mr. Sisisky is recognized.

Mr. SISISKY. I can't let that statement go by. You said it cost more money by having Newport News in the loop. Are you talking about the *Seawolf*?

Admiral DEMARS. Either, Mr. Sisisky.

Mr. SISISKY. If I am correct, and I don't know what the difference was that the 22 was given to Electric Boat. Was it not?

Admiral DEMARS. No. No, it was competed.

Mr. SISISKY. I thought because of the—I didn't say 21 now, I said 22.

Admiral DEMARS. No, the 22 was competed. Electric Boat won and Newport News protested and then lost the protest.

Mr. SISISKY. But 23 was not.

Admiral DEMARS. So, 23 is out there. Newport News lost both 21 and 22 competitions.

Mr. SISISKY. Would the gentleman yield for a follow-up on that question?

Mr. DELLUMS. Yes.

Mr. SISISKY. I think it is important to put this in the context of competition for the SSN–21 and the 22. I would like for the committee to be furnished with the bid for SSN–21, the bid on SSN–22 and what we have paid to-date on 21 and 22 and the projected cost to completion.

Ms. SLATKIN. Fine.

[The following information was received for the record:]

The following information is based on the construction contract award and the current Program Manager's estimate at completion.

The 1989 contract award amount for the SSN 21 was $718M; the amount paid as of April 13, 1995 is $813M; the adjusted estimate at completion is $919M. The 1991 contract award amount for the SSN 22 was $610M; the amount paid as of April 13, 1995 is $610M; the adjusted estimate at completion is $731M. Both estimates at completion and amounts paid to date were adjusted to exclude costs such as the SSN 21 HY–100 welding settlement; the SSN 22 cost increases due to the settlement of the Newport News litigation; and other work scope changes not included in the original contract.

In addition, when the contracts for the SSN 21 and SSN 22 were awarded, the projected size of the *Seawolf* class was 29 ships. In Fiscal Year 1992, following the award of both construction contracts, the program was truncated to two ships. This has resulted in substantial increases in both construction and material costs. Furthermore, the absorption of fixed costs by only two ships rather than the multiple ships planned has impacted the cost of the program.

Mr. DELLUMS. Mr. Chairman.

Mr. Hunter. Yes?

Mr. DELLUMS. Again, I want to compliment you for these proceedings and compliment our witnesses for not only their responses, but their endurance and stamina. I would like to make a couple of observations.

One, I would characterize as a fiscally conservative observation and then one I would characterize as a radical policy observation.

My first observation is that the gentleman from Missouri, Mr. Skelton, in my opinion asked one of the most poignant questions directed to Mr. O'Rourke; simple, straightforward and powerful. What is the most cost effective solution to this obvious problem that we have.

Mr. O'Rourke's response was equally straightforward. He said that the body of factual cost data is insufficient to answer that question. That response was unchallenged by anyone in the room.

This observation, Mr. Chairman, it is an incredibly sad commentary that at the point where we are on the eve of a multi-billion dollar decision with enormous military and industrial base implications, that we find ourselves with an insufficient cost data base to answer that obvious straightforward question. That is sad and tragic.

Now, with respect to my radical policy thought. A number of questions have been asked here this afternoon about the Russians and the quietness and the advanced technological capability that they are amassing in the area of submarine development. The cold war is over.

My hope is that we don't redraw the line in the sand and that we don't start referring to Russia as we used to refer to the Soviet Union because I believe that we are confronted with an incredibly wonderfully and marvelous opportunity to advance the human condition in the context of the post-cold war world.

If you ask the question, why are we pursuing advanced submarine technology with respect to Russia, and I think a number of your questions, Mr. Chairman, spoke to that.

They now are developing a more quiet submarine. It occurs to me and concomitant to that is that if they are developing a more quite submarine, that the problem that we can envision down the road is one of proliferation.

Suppose we, Mr. Chairman, just sat down with the Russians and said, before you pursue this advanced technology, let's talk. In the context of a post-cold war world, you don't go down that road. We

won't go down that road. It will save you a hell of a lot of money; save us a hell of a lot of money and you don't engage in the proliferation problem.

Maybe this is the moment when that ought to be considered before the horse is out of the barn. I realize that that's a radical thought, Mr. Chairman, but it seem to me that in the context of a post-cold war world, maybe we need to begin to think brilliantly and substantively and creatively about how we advance down the road.

I sat here for 24 years. The Soviet Union was the rationale for all of these incredible expenditures. Now, it is the Russians. It seems to me that a door is open here now to advance the cause in a very different way.

Maybe that is a radical thought. In the context of a limited dollar environment, maybe we ought to start thinking a little more radically. I just throw that out as an observation. I would rest on both observations that I made.

The gentleman from Missouri, Mr. Skelton, asked an intelligent question. All of us here, in order to carry out our significant fiduciary responsibilities are about to make a decision that is in the tens of billions of dollars, with economic impact upon regions, industrial base questions affecting thousands of lives, and we don't have a basic answer to what is the most cost efficient basis for which option that we take?

That is compelling. That is powerful. That is important. Maybe, Mr. Chairman, you asked somebody to try to put that together. I don't think that, that ought to rest solely on Mr. O'Rourke's back. I think it ought to rest on a whole lot of other people's backs.

Mr. HUNTER. Let me respond.

Mr. DELLUMS. Anyway, I thank you for your generosity and I appreciate these hearings.

Mr. HUNTER. Let me respond to my friend because he has raised a good question. I know it is digressing somewhat, but the threat is one reason we are here. Let me just say to my colleague that initially after the dissolution of the Soviet empire began, a number of us looking at the intelligence data that we had with respect to the Soviet submarine capability thought that we were seeing a, the last, the momentum, if you will, the continued production and qualitative improvements as being a result of momentum coming from the cold war.

Then we began to realize that new keels were being laid, that tremendous resources from a country that had very little resources were being expended in this area. Mr. O'Rourke gave three I think possible reasons for this.

One reason was that under our Arms Limitations Treaties the Soviets are going to put more of their strategic eggs, if you will, in the submarine basket and they want attack submarines to attend this fleet of ballistic missile submarines.

Whatever the reason, I would say to my friend, submarines are deadly systems. I think Mr. Hitler sunk some 400 American ships at the Panama Canal in World War II with just a couple of boats. Despite all of Duke Cunningham's movies to the contrary, 80 percent of the ships in World War II that were sunk, were sunk by submarines. It is our duty, I feel, to the men and women that we

put in our submarines that they be the very best qualitatively. Second, that they match at least the capability of the other people, who for whatever reason are continuing to put enormous resources in that area. I would be happy to engage with my friend on that issue, but the Russians have decided to go forward. I would be happy to yield.

Mr. DELLUMS. Just one last observation in that regard. At the end of the day, we are going to be confronted with issues of proliferation. My admonishment in the 1970s and the 1980s when we were pursuing cruise missile technology was that the issue was not simply advancing the technology, but ultimately you are going to deal with the question of proliferation.

Over the last several weeks, what have we been dealing with in the hearings right in this room? Proliferation of cruise missile technology. It is all coming back. What I am simply saying to you is that we now, in the context of the post-cold war world have an opportunity to think in different ways about these issues.

This advanced technology ultimately becomes a proliferation issue for us downstream. I am simply saying, maybe it is a radical thought. Maybe it is too radical an idea, but I lay it on the table simply to say that we have been blessed with an enormous opportunity, this generation.

That we have gotten ourselves beyond the cold war. Let's don't blow the moment by tinkering at the margin because we lack the will to step out there boldly to change the world.

Proliferation is a major issue. I think it is going to come back to confront us in the same way that cruise missile technology is now a proliferation issue that is confronting us because we were pursuing technological superiority and we didn't think downstream about what that meant in terms of what we would be facing with proliferation problems.

Submarines down the road are going to be a big deadly proliferation issue. I am simply saying to you, maybe this is the moment, before you let the horse out of the barn to look at this question.

Mr. HUNTER. I would simply say to my friend that at a billion and a half a copy, proliferation may not be the problem with these submarines. Mr. O'Rourke, you wanted to speak on this?

Mr. O'ROURKE. Yes, actually, I did have a comment. I don't think that Representative Dellums' proposal is as radical as he presented it to be. In this country and in other countries around the world, between 1986 and 1990 there was a fairly active debate about naval arms control that was prompted mostly by proposals that were coming from the Soviets.

I think most of those proposals were quite lopsided and in favor of the Soviets. They were dismissed by Western naval analysts. There was one naval arms control proposal which actually originated in the West among Western naval analysts, not myself, but some people that I am aware of in my own work as a naval analyst. That one proposal that they threw back at the Soviets was attack submarine arms control. That occasioned a report that CRS put out in 1990 which I wrote which summarized the arguments for and against the idea of attack submarine arms control.

What was very interesting about that idea is that when the Western naval analysts in some of these international conferences

took that idea to the Russians, excuse me, rather to the Soviets, that was the one idea about naval arms control that they did not want to talk about.

The idea of doing this is not radical at all. In fact, it originated in the West and not with the Soviets. It would depend on a change in heart among those now in Russia who debate this issue about whether they would be very receptive to it. At the time, that was the last thing they wanted to talk about in naval arms control.

The other thing to point out is that requirements for attack submarines are driven only in part by the Russian side of the equation. you would have to ten look at the non-Russian side of the equation which I discussed in the earlier part of my presentation.

Even if we somehow found a way to take the Russians's side and put it off the table, you would still face the argumentation that links requirements for attack submarines to non-Russian considerations for fighting major regional conflicts, and for maintaining peacetime presence in parts of the world that are basically, for the most part, disconnected with Russia.

If you could handle that side of the equation as well, then you would have a basis for perhaps reassessing what our overall requirements for attack submarines would be.

Mr. DELLUMS. I appreciate your remarks.

Ms. SLATKIN. Mr. Chairman.

Mr. HUNTER. Thank you, Mr. O'Rourke. Yes, Secretary Slatkin.

Ms. SLATKIN. May I make a remark about Congressman Dellums' first point? As you said, Mr. Skelton asked Ron O'Rourke the right question. Had he asked me, I would have given a very different answer, as I tried to give you in my formal presentation. I believe that we have studied this problem for many years very thoroughly inside the Department.

Mr. HUNTER. Let me ask you a question then on that, Ms. Slatkin. I have got a document in front of me that came out of Newport News saying they could save $3.5 billion. Have you studied that proposal?

Ms. SLATKIN. That was the one point I wanted to make. I think what is new here at this table today is a proposal to save $2 billion over 6 years. I have seen the proposal actually a week ago that you referred to on $3.5 billion. Yes, we have taken a look at it. We have a view on that. The $2 billion over 6 years is indeed the newest thing that has come out.

I believe the Department has been more than forthcoming in sharing with you the volumes of studies. Let me reiterate, I would be happy to share all of the work that has been done, not only with you. I believe we shared it with CRS. I would believe we have shared it with GAO.

Let me reiterate, this is an important policy decision, as all of you have stated. I believe that the best service we can do for you is to provide you all of the data that we have on the work that has been done.

Mr. HUNTER. I agree with that.

Ms. SLATKIN. We would be happy to do that.

Mr. HUNTER. Let me just say that I think the best way for us to reach this conclusion or reach our decision on this issue is to follow the outline of Mr. Skelton's question.

What I would like to do, I know there is a lot of information out there. A lot of numbers have been generated on various aspects of this issue, various pieces of the question. I would like to put together a question from the committee for Mr. Fricks, with appropriate commentary, and analysis from existing information and new analysis that you might make, Secretary Slatkin, Admiral Demars, Mr. Turner, Mr. O'Rourke, and Mr. Davis in commentary on this. Let them take their shot at this, at least with respect to putting out an analysis.

[The following information was received for the record:]

Subsequent to the hearing, the Congressional Research Service provided the Navy with a set of questions. The analysis required to answer these questions is underway. When the analysis is completed, the requested material will be provided by separate correspondence to the Committee and the Congressional Research Service.

Mr. HUNTER. Mr. Fricks, let me ask you, have you been at all deterred by the Navy in terms of getting your study forward, your proposal?

Mr. FRICKS. I have not been. We have presented it, as Ms. Slatkin said, last week. We have told them that we would provide them additional details on that subject. We have not yet provided that; probably the first part of next week, and we will provide it to the committee also.

Mr. HUNTER. OK. So, there hasn't been anybody trying to keep you from getting that to the committee?

Mr. FRICKS. There has not been.

Mr. HUNTER. OK. Why don't you put that together and I think we probably need a time limitation. We would like to have you get that to Ms. Slatkin and to the other members of the panel and let Mr. Turner have a chance to comment on that also. Get that back with commentary to the committee by the 15th.

Mr. HUNTER. Mr. O'Rourke, we may want to shape a couple of different questions to you. Does that sound reasonable?

Mr. O'ROURKE. It does. If I could just add something to what Ms. Slatkin said earlier. I don't think Ms. Slatkin and I are in disagreement. Ms. Slatkin said that the Department had studied the issue extensively. I have no doubt about the fact that they have.

What I said is that we don't have very much information available in the open domain. I think the information is out there somewhere, but I have not seen very much of it. Actually, I don't think the Navy has shared very much of it with me, although they may have shared it with GAO or other committees or agencies.

Mr. HUNTER. I would like you to confer with Mr. Thompson, with our staff, and put together an inventory of questions answered; questions that require answers to be able to allow us, in your estimation, Mr. O'Rourke, to be able to make this decision.

We will use that in shaping the question for Ms. Slatkin and for Admiral Demars. We want to get everything we can on the table here. This is a tough one.

Mr. BATEMAN. Mr. Chairman, may I suggest some additional questions very specifically and briefly that I think needs to be put forth.

Mr. HUNTER. Certainly; Mr. Bateman has some more questions.

Mr. BATEMAN. One of the questions that needs to be responded to is last year the Secretary of Defense told us that their industrial base decision was the $1.2 billion more expensive decision.

I would like to know how he arrived at that figure; what it did and didn't include. We are told today that to change that preconceived industrial base decision, because of the way the submarine is being designed, would require very, very costly changes of maybe $300 million. I would like the details. The devil is in the detail. Why the cost?

Mr. HUNTER. Who offered that $1.2 billion figure?

Ms. SLATKIN. I did. It is Dr. Perry. I would be happy to provide that.

Mr. HUNTER. OK.

[The following information was received for the record:]

The values cited are from cost information contained on page 57 of the Bottom-Up Review. The Bottom-Up Review cites the following values:

$625M in smart shutdown/reconstitution costs related to building the New Attack Submarine at Newport News. This option would end submarine production at Groton, CT.

$1.8B for submarine construction at the Groton shipyard. The $1.8B includes $1.5B for completion of the 3rd SEAWOLF as well as $300M for the industrial base impact caused by the gaps in submarine production i.e., a 5-year gap from SSN 22 to SSN 23 and a 2-year gap from SSN 23 to the New Attack Submarine. This option avoids the adverse consequences of shutting down a nuclear certified shipyard and re-opening it later and has the added benefit of providing the nation with a third state-of-the-art SEAWOLF submarine.

The $1.2B is the difference between smart shutdown/reconstitution ($625M) at Newport News Shipbuilding and the $1.8B for bridging submarine construction.

A decision not to authorize SSN 23 coupled with a competition for the lead New Attack Submarine could result in the shift of the current design/build process at Groton to an alternative process at Newport News, generating a cost impact of roughly $650M to $1.1B plus potential intangible costs that could be hundreds of millions of dollars. Additionally, due to the disruption in the current design/build process the construction period for the lead ship could be extended up to 2–3 years. There would be no delay in the start of construction.

The additional costs would be incurred in three areas: (1) the costs associated with shifting to a single nuclear capable shipbuilder including cost increases to existing contracts due to the loss of SSN 23; (2) cost impacts associated with shifting the current design/build process to some alternative process and (3) potential other costs. The rough estimate of Government liability in each area (in then year $) is: Shifting to single yard: $440M—$610M; Cost increases due to shift: $210M—$490M; Potential Other costs: Unknown—(could be hundreds of millions of dollars).

Shifting to a single nuclear capable shipbuilder: Shifting the design/build effort for the lead New Attack Submarine to Newport News, coupled with the cancellation to SSN 23, is highly likely to force the shutdown of the Groton, CT shipyard. It has been the consistent position of the Navy to support SSN 23 as a bridge to permit transition to production of a more affordable attack submarine starting in FY 1998. There is no product line other than nuclear powered submarines at Groton, CT that would otherwise sustain them as a going concern. The potential costs for which Electronic Boat would likely assert government responsibility in the event of closure include: retiree benefits, the value of undepreciated assets and the ongoing facility costs until plant closure is fully completed. Additionally, the costs of existing contracts would be adversely impacted as noted in the following paragraphs.

Existing Contracts: Without SSN 23, overhead/indirect cost allocations would increase for the shipbuilder's remaining contracts. Specifically:

The shipbuilder's existing contracts presume SSN 23 will absorb a substantial share of the shipbuilder's overhead. Deletion of SSN 23 would cause overhead to be allocated (via higher overhead rates) among remaining contracts. Moreover, additional indirect costs such as construction facility/equipment lay-up costs and unallocated material cost would be charged to existing contracts.

Without SSN 23, both SSN 21 and SSN 22 contracts, and OHIO Class contracts, could exceed ceiling price (and shipbuilder claims could be filed) as a result of overhead/indirect costs and "Other cost" impacts discussed below. While this would put SSN 21 and SSN 22 well above the congressional cost cap, the Government is never-

theless obligated by contract to pay its share of cost increases up to contract ceiling. (Note: Contracts for SSN 21, SSN 22 and OHIO Class are fixed-price-incentive contracts with negotiated target and ceiling prices. If the contract is completed under the target price, the shipbuilder shares in the amount less than target; if the contract is completed over the target but below the ceiling, the shipbuilder pays a share of the amount over target. Above ceiling price, shipbuilder bears all costs. The cost cap is not directly related to contract ceiling prices.)

Higher overhead rates would also result in increased costs to Navy on its engineering and design contracts, which are cost type contracts for which Navy pays all allowable and allocable costs. There contracts represent about half the work to be performed by the shipbuilder for the rest of the decade.

Cost increases due to shift of design/build: The Bottom-Up Review direction to build the New Attack Submarine at Groton, CT provided an early opportunity to form partnerships among the shipbuilder, designer and associated vendors much earlier in the ship design process. This design/build process is a key to the affordability of the New Attack Submarine. The design is being optimized to the Groton, CT method of construction. Premature competition would result in both reengineering the design effort done to date and resolving the incompatibility between the Groton, CT design tools/construction methods and those at Newport News. The delay due to design re-work would translate into an extended time span required to build the lead ship.

Beyond the complications associated with the design transfer other negative cost impacts would be realized as follows: Newport News has not been awarded a new construction attack submarine in over 8 years. Thus, there would be facility restart and reconstitution costs incurred.

There would be some disruption to current CVN efficiencies due to workforce redistribution and management attention dilution.

As is the case with a shipbuilder, there would be increases in supplier costs due to the loss of SSN 23 material orders. These burdens would be re-allocated to New Attack Submarine efforts.

Potential Other Costs. There is a potential for claims to arise as a result of supplier or contractor workforce disruption or if the contractor, or component supplier, were to close his plant or portions thereof. Such claims cannot readily be estimated, but could total hundreds of millions of dollars for costs such as environmental cleanup, severance pay or depreciation. While the Government does not believe it would be liable for these additional expenses, determining contractor or Navy responsibility for such costs likely would be contentious, potentially resulting in substantial litigation costs to the Government.

Mr. HUNTER. Let me just ask you, Secretary Slatkin, was that a net figure, the $1.2 billion, or did that include the deductions in savings as a result of the additional costs of closing down work at EB and the extraction of these processes?

Ms. SLATKIN. As I recall the genesis of the figure, we had an independent estimate done inside of the Department of the premium over the steady state of maintaining two yards, not the near-term costs, but the premium.

Our independent estimate said it was on the order of $200 million once you hit steady state, $200 million a year premium in so far as sustaining two yards as compared to going to one yard. That, I believe, is where the Secretary of Defense got that information.

Mr. HUNTER. OK. Thank you. Mr. Kennedy has another short question here and we are going to be concluding fairly shortly.

Mr. KENNEDY. Thank you. First of all, I would like to thank the Chair for including me in on today's hearing. I very much appreciate the chance to be at this hearing and to hear the testimony and to ask these questions.

I would also like to ask that, aside from the CRS and the GAO and the industry offering their analysis, I would like to make sure that among those analysis we include Admiral Demars' and Admiral Jones' input in terms of the military requirements. I heard constantly in the testimony, GAO and CRS speak on behalf of DOD

and what DOD's requirements were. I just wanted to be sure that we don't leave any of those questions hanging as far as DOD's perspective is concerned. I would ask that when they do come back with their answers, Mr. Chairman, that we can include those answers to those questions as well.

[The following information was received for the record:]

The United States must retain the ability to build advanced, quiet nuclear submarines in sufficient numbers to ensure our present and future undersea superiority. The nuclear shipbuilding industry must be able to economically produce submarines at the low production rates required today and also be capable of sustaining higher rates of production to meet future uncertainties. It should be noted that although Russian submarine production has been reduced somewhat from 1980's levels, their submarine shipyard at Severodvinsk has more building ways and is larger than both our Newport News, VA and Groton, CT yards combined.

Advanced submarines like *Seawolf* and the new attack submarine provide the Nation with the key characteristics necessary to control the undersea battlespace. Increasing numbers of countries are obtaining state-of-the-art submarines that can significantly threaten surface shipping, particularly in littoral choke points such as the Strait of Hormuz. The most effective weapon to counter this threat is still the submarine, which can operate in the littoral region with relative impunity because of its inherent stealth. The submarine is immune to tactical ballistic missiles and coastal cruise missiles which pose a considerable threat to other forces until air superiority is established. Additionally, improvements in magnetic quieting and mine detection sonar, coupled with the ability to covertly monitor minelaying operations, will enable *Seawolf* and the new attack submarine to avoid minefields.

Armed with long range cruise missiles, our SSNs can position covertly in hostile waters and deliver devastating strikes on land targets with no forewarning. As state-of-the-art sensors and processors become increasingly available in Third World markets, the advanced coustic stealth of *Seawolf* and the new attack submarine becomes even more important for this mission. Similarly, the successful covert deployment of Special Operations Forces requires absolute stealth in the littorals.

The most demanding mission for the SSN remains anti-submarine warfare. The keys to success against the quiet diesel or nuclear submarine are acoustic quieting, effective capable sensors and processors, weapon system performance and crew proficiency. U.S. submarines remain the finest trained in the world, equipped with the most advanced homing torpedoes and state-of-the-art sensor and processing technology.

However, for the first time since *Nautilus* put to sea, the United States no longer has the clear advantage in acoustic stealth. Today there are Russian submarines at sea and under construction that are quieter, at some speeds, than our Improved 688 class submarine. Despite our advantages in combat systems and crew training, this loss of superiority in acoustic stealth reduces the marine of overall United States-Russian submarines superiority to its lowest level in history. This is unacceptable. It is a military requirement that we put to sea submarine with *Seawolf* level quieting as soon as possible and in numbers sufficient to counter this new threat. The current Navy plan for *Seawolf* and the follow-on new attack submarine provides the necessary level of construction to meet this requirement. Any delays to the planned delivery schedule results in unacceptable military risk.

Mr. FRICKS. Excuse me, Mr. Chairman. Can I verify one thing?

Mr. HUNTER. Yes, Mr. Fricks, go right ahead.

Mr. FRICKS. My associates tell me that there may be something misleading here because Ms. Slatkin asked me about the 6 years.

Mr. HUNTER. Yes.

Mr. FRICKS. I am talking about five boats from 1998 through 2003 where we have got five boats planned to be built. That is a savings over those five boats.

Mr. HUNTER. That's the $2 billion savings.

Mr. FRICKS. That's correct.

Mr. HUNTER. Okay. When you get a chance to put this analysis before us, you can keep that clear.

I want to thank the ranking member for asking about one question the whole day and asking the best question. Mr. Skelton, I will

be working with you and with our staff folks to formulate the boundaries of these answers we want to get from our particular witnesses. Thank you for your wisdom.

Mr. SKELTON. Thank you. I came very close to giving a discourse on naval conferences which took place in the late 1920's and early 1930's, but I have restrained myself and I thank you for an excellent hearing.

Mr. HUNTER. Before we close down, Mr. Skelton, let me just say to Mr. O'Rourke that we made a number of them and in one conference, we restrained the weight, the tonnage between the United States, Great Britain, and Japan. We had to make the *Wasp* especially fragile because of this great treaty we had with Japan.

The Japanese subsequently sunk the *Wasp* as a result of that. In the old days, naval treaties were the arms treaties of the day. I think at one time Congress, the Appropriations Committee, in the late 1920's and the early 1930's recommended laying up what became half the carrier force in the Pacific during Pearl Harbor.

Actually, naval treaties were probably more prolific in those days than arms treaties today, strategic weapons treaties. For my conservative point of view, they didn't service very well.

Thank you for being with us. We want to thank the witnesses for your testimony, your candor, your endurance. We will be getting back with you. This hearing is adjourned.

[Whereupon, at 5:27 p.m., the hearing was recessed.]

NEWPORT NEWS SHIPBUILDING
NEWPORT NEWS, VIRGINIA 23607
804-380-7377

WILLIAM P. FRICKS
PRESIDENT AND
CHIEF OPERATING OFFICER

April 13, 1995

The Honorable Duncan Hunter
Chairman, Subcommittee on Military Procurement
Committee on National Security
2340 Rayburn House Office Building
U.S. House of Representatives
Washington, D.C. 20515

Dear Chairman Hunter:

Thank you for your letter of April 5, 1995 respecting the specific data requests which you asked for during the March 16, 1995 hearing on submarines.

My review of the transcript pages which you forwarded indicates that the questions fall into two basic areas:

(1) Detailed data supporting Newport News Shipbuilding's claim that it can save the Navy $2 billion if the first five Navy Attack Submarines are built here rather than Electric Boat, and

(2) More specific information as to what Newport News would need in way of overhaul and design work in order to be competitive in a procurement of Navy Attack Submarines in FY 1998.

By letter from Patrick A. Tucker, Tenneco Director of Federal Relations, dated April 4, 1995 we have already submitted to you the detailed support for the first question.

As to your second request, we enclose a list of work which we would require in order to remain competitive in a Newport News Shipbuilding bid in FY 1998.

I should emphasize one particular aspect: If Newport News Shipbuilding is to compete on an even basis for the NSSN, not only must we maintain a sufficient submarine work force, but Electric Boat must not be allowed to build prototype equipment prior to the solicitation that can only be used, cost effectively, at their yard for actual ship construction. We understand that the Navy and Electric Boat may be pursuing this approach in the reactor plant development. This will give Electric Boat a substantial advantage. Action must be taken to prevent this.

Finally, the competition itself must be conducted in a fair manner. In order to assure this, the procurement should be: (1) on a multi-ship basis to help establish cost of a number of boats at the earliest possible time and avoid "buying in," and (2) decided on the basis of bids as submitted, not as adjusted by subjective internal Navy evaluation; e.g., "for cost realism," "industrial base mobilization," or any other reason which could be used to tilt the playing field after the fact.

We trust that this data will satisfy your needs. If you have any further questions, please do not hesitate to contact me.

Sincerely,

ENGINEERING

SSN688 Class Planning Yard - 250 Employees

We should continue to be the Navy's Planning Yard for the LOS ANGELES Class submarines. For 20 years we have performed this function. Planning Yard work consists of life cycle support of the LOS ANGELES Class including engineering support of planned modernization, maintenance planning, training development, preparing and maintaining technical documentation, repair planning, and reactor refueling planning. The Navy has indicated all submarine planning yard work will eventually be consolidated and transferred to EB. This makes no sense for the LOS ANGELES submarines, since we developed the entire class design beginning in the mid-60's and have maintained the design since then.

SEAWOLF Class "Lead Design Yard" and "Planning Yard" - 150 Employees

We should also maintain our existing position as SEAWOLF Class "Lead Design Yard" for the non-propulsion part of the submarine. This includes life cycle support such as upgrading the design to incorporate changes the Navy may make, maintaining technical documentation and spare parts, and supporting the crew training program. We understand the Navy only intends to extend our SEAWOLF Lead Design Yard contract until the end of 1996, and to begin transferring the work to EB even as early as this summer. To maintain our design expertise we need to keep this contract and associated Planning Yard work through the 1998 NSSN construction award planning support for the periodic shipyard maintenance and upgrade availabilities.

NSSN Design Participation - 200 Employees

We must participate in the NSSN Design work to remain competitive. This could be accomplished through a small subcontract from Electric Boat to NNS for part of the non-propulsion plant design (roughly 190 people) and general oversight (roughly 10 people) for the entire design, including the propulsion plant. With our experience as the SEAWOLF Lead Design Yard, we have the most up-to-date experience to apply to the NSSN non-propulsion design. We also participated in a large number NSSN design studies over the last four years, and contributed many ideas to the current design. EB has recently been awarded a contract to perform the non-propulsion design on the NSSN, in addition to the propulsion plant design contract they have had for several years. EB will have to hire engineers to carry out this new NSSN non-propulsion design contract, while NNS will be forced to lay off or reassign experienced submarine engineering personnel as the SEAWOLF design work is completed.

Measures to Stop Production use of Full-Scale Prototype Reactor Plant

The Navy appears to be developing the NSSN reactor plant in an unusual manner. Under the propulsion plant design contract, Electric Boat plans to assemble this reactor plant for prototype testing prior to award of the ship construction contract and then will use the same plant in the first ship as the production unit. The plan to assemble the reactor at Electric Boat (including loading the fuel prior to assembling that part of the ship) could significantly increase the cost of, or even prohibit, using that prototype plant for a ship built at another shipyard. In any case, in order to permit realistic competition on the first ship, the Navy must ensure that NSSN development plan does not in any way give an unfair advantage to Electric Boat.

WATERFRONT

Four Submarine SRAs Per Year with Two Submarine overhauls

Our studies of the submarine construction workforce (copies of which have previously been provided to your staff) have shown that about 80% of the skills needed to build submarines are maintained by building nuclear-powered aircraft carriers. Most of the remaining construction skills can be maintained by submarine overhaul and maintenance work. Four SRAs per year for the years 1996-1999, inclusive and one overhaul in 1997 and 1998, respectively, would provide this work. We can be flexible as to the start of each of these assignments and will be pleased to meet with the Navy to work out a precise schedule.

GENERAL DYNAMICS
Electric Boat Division
75 Eastern Point Road, Groton, Connecticut 06340-4989
203-433-3000

April 19, 1995

The Honorable Duncan Hunter
Chairman, Military Procurement Subcommittee
Committee on National Security
U.S. House of Representatives
Washington, DC 20515-6035

Dear Mr. Hunter:

As you requested in your letter of April 5, 1995, I am forwarding responses to the questions posed at the hearing of the House National Security Committee on Thursday, March 16, 1995.

The first question requested my comments on the details of the Newport News claim of $2 billion in savings on the NSSN program. As I understand that the Newport News information will not be available for review until at least April 28, 1995, I am providing a top-level assessment of the savings issue at this time. This analysis was previously presented to the National Security Subcommittee of the House Committee on Appropriations on April 5, 1995.

The second question requests an analysis of the impact of competition for NSSN program construction on both Electric Boat and the cost to the government. An assessment of the impact is included in the enclosed response, based on assumptions about the competitive situation as outlined by Newport News.

I appreciate this opportunity to support the work of the Committee on National Security on this vitally important issue. Please do not hesitate to contact me if you require any additional information or support on this matter, or wish to explore competitive or workload scenarios other than the one reflected in the response to the second question.

Sincerely,

James E. Turner, Jr.
President

EXECUTIVE SUMMARY

Electric Boat was asked two questions by Chairman Hunter:

1. *Are the Newport News claims of $2B savings on the first five New Attack Submarines achievable?*

2. *What is the impact of competition for the New Attack Submarine on Electric Boat, and what is the cost to the government of such a competition?*

Our response to the first question is **the claimed savings by Newport News are not achievable**. Because the details of the Newport News claim are not yet available for analysis, we prepared an independent estimate using approximate factors for submarine construction based on Electric Boat experience. Newport News factors will be similar. Summarizing this analysis, there is about $500M available for the shipbuilder to search for overhead savings. Success in extracting savings is uncertain, and Newport News must demonstrate to the Navy what percentage they believe is achievable. **However, finding a $2B savings in a $500M overhead expense is simply not credible**.

In response to the second question, **the estimated cost to the government resulting from conducting a competition would exceed a range between $220M and $1.9B, dependent upon who wins**. The estimates include costs to "level the playing field", transfer design information, costs to actually conduct the competition, shut down and/or reconstitute facilities, program delay, and loss of future competition. The costs do not include the impact on the submarine technology base and other costs which can be better quantified by the government. Because Electric Boat has reengineered the entire shipyard to one purpose - - to build an affordable New Attack Submarine - - the cost to the government is far less if Electric Boat wins.

Winner	Government Costs Resulting from Competition
Electric Boat	would exceed $220M to $350M
Newport News	would exceed $1.4B to $1.9B

No matter who wins, competition will increase the cost of submarines over the foreseeable future.

In conclusion, the enclosed analysis shows the Newport News proposal is very costly for the government. The claimed $2B cost savings are not achievable, and additional government costs incurred as a result of competition could exceed $1.9B.

HNSC Hearing of March 16, 1995 - Testimony lines 2528-2530

CHAIRMAN HUNTER'S QUESTION:

I would like Mr. Turner be given a chance to have his say with respect to whether or not the savings can be achieved; to have a chance to comment on that.

MR TURNER'S RESPONSE:

In his testimony to this committee, Mr. Fricks stated that "Newport News believes that it can save the U.S. government approximately $2 billion in the Navy's funding plans ... We can do this by spreading the fixed costs associated with shipbuilding over a much larger volume of work, and by more efficiently utilizing skilled trades and engineering talent. ... I'm talking about five boats from 1998 through 2003, ... and that's a savings over those five boats."

Because the details of the Newport News claim are not yet available for analysis, the following estimate, presented to the National Security Subcommittee of the House Committee on Appropriations on April 5, 1995, is provided. Summarizing our analysis, there is about $500M available for the shipbuilder to search for overhead savings. Success in extracting savings from the $500M is uncertain, and Newport News must demonstrate to the Navy what percentage they believe is achievable. However, no one can find a $2B savings in a $500M overhead expense, and the Newport News claim is not achievable.

This analysis is based on known NSSN programmatic values and several standard ratios which have been and continue to be applicable to nuclear submarine construction. Specifically:

- The total SCN projection for the first five NSSNs is $11.1 billion, based on FYDP funding projections, a $1.5 billion USN target cost for the fifth ship, and appropriate learning curve assumptions for the five ships identified in Newport News' claim.

- The shipbuilder share of SCN cost is approximately 45%. The government expends 55% of the funds directly for Government Furnished Equipment (GFE) such as nuclear components, propulsion plant equipment, and combat systems, for Program Management and Supervisor of Shipbuilding activities, and for logistics and other services and materials. Currently, the shipbuilder's share of SSN21 is ~50% and SSN22 is ~41%.

- A reasonable profit rate on Navy ship construction is at least 10%. The SSNs currently under construction at EB and Newport News average 11.8% and 12.2% profit, respectively.

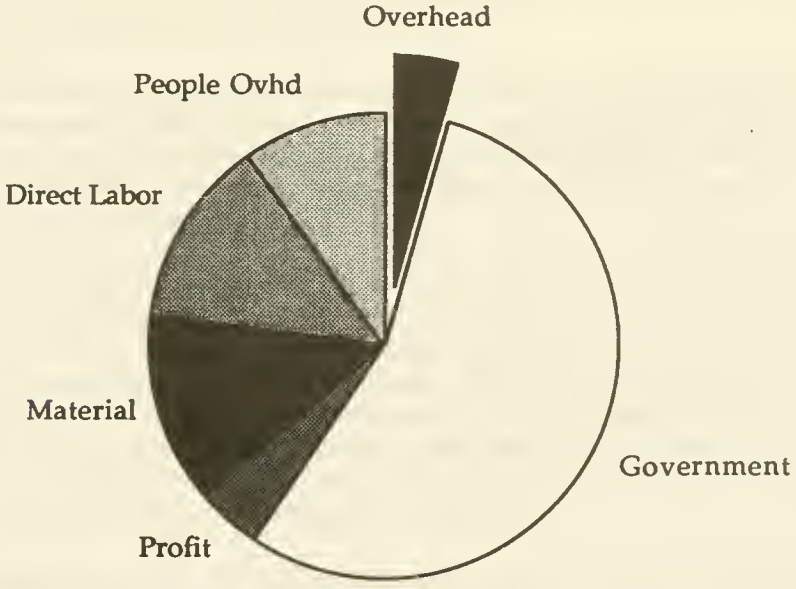
- Approximately one-third of the shipbuilder share of SCN goes directly to suppliers for construction material. SSN21 and the latest Tridents are running ~36% material, while the last SSN688 is under 30%.

- Of the shipbuilder cost for direct labor and all overhead, approximately 45% goes to direct labor. Current attack submarine contracts are all in this range.

- Of total overhead, approximately 70% is people-related. In fact, Newport News has recently cited this ratio in their employee newspaper in discussing the need for benefit cost reductions. These costs, such as FICA, holiday and vacation pay, medical and dental benefits, etc., are assumed to be variable overhead costs associated with the labor to construct the ship, and would be incurred by Newport News with the construction work. Even this ratio probably overstates the potential savings, since it assumes that all of the fixed costs associated with submarine production at Electric Boat would be avoided by Newport News.

The net result of applying these admittedly approximate but clearly appropriate ratios to the question of potential savings from shared overhead results in maximum potential savings of ***less than $500 million*** - - a long way from $2 billion - - as shown below.

Total SCN for first five NSSNs	$ 11.1 B
Less Government share of SCN (55% of above)	($ 6.1 B)
Shipbuilder share of SCN	$ 5.0 B
Less reasonable profit (10% of above)	($ 0.5 B)
Total shipbuilder labor, material, and overhead	$ 4.5 B
Less Material costs (33% of above)	($ 1.5 B)
Total shipbuilder direct labor and overhead	$ 3.0 B
Less direct labor costs (45% of above)	($ 1.4 B)
Total overhead costs	$ 1.6 B
Less People related overhead (70% of above)	($ 1.1 B)
Maximum potential overhead savings	$ 0.5 B



Even beyond the issue of the level of savings possible from shared overhead is the greater question of the overall cost of a change to the Navy submarine acquisition strategy. When the costs of "leveling the playing field", conducting a competition, transferring the NSSN design, shutting down Electric Boat, etc,, are considered, ***the reality is that minimal savings will turn into significantly greater cost.*** Electric Boat is still eager to provide our analysis of the Newport News savings estimate when it becomes available.

HNSC Hearing of March 16, 1995 - Testimony lines 2848-2852

CHAIRMAN HUNTER QUESTION:

Okay. Mr. Turner , could you put together for the committee an analysis of the impact on your work force, your yard and what you think the cost to the government would be of a competition? You might go both ways with that, if you win the competition or if you lost the competition.

MR TURNER RESPONSE:

Regardless of who wins, whether Electric Boat or Newport News, ***competition will increase the cost of submarines over the foreseeable future***. All scenarios we've looked at, no matter who wins, are more costly and introduces greater programmatic and/or technical risk than the Navy plan.

Of the many possible competitive scenarios, the most likely is based on an environment akin to that suggested by Mr. Fricks of Newport News, i.e. that the Navy will take the necessary steps to "level the playing field". These win or lose scenarios and the rough order of magnitude estimates related to them are based on the following major assumptions:

1. Electric Boat will be awarded an FY96 contract to construct SSN23. This work will effectively "bridge" the Electric Boat workload gap until start of NSSN construction.

2. Electric Boat will complete the NSSN design under an Integrated Product and Process Development contract, as if it included the construction of the lead ship. This assumption may not be achievable. Both the design/build process, and critical path activities on the integrated program schedule, would be disrupted by the introduction of competition for construction of the first ship.

3. Newport News will be awarded participating design yard / design review contracts which will maintain NNS familiarity with the developing NSSN design. At some point, interim design products will be developed which will constitute the construction proposal specifications and drawings required to support an FY98 lead ship construction contract.

4. As Mr Fricks stated in his testimony to your committee on March 16, 1995, *"In order to ensure the savings associated with this competition, the Congress must ... keep... Newport News active in the submarine business by permitting us to have a substantial presence in the design, repair, and refueling of submarines..."* Accordingly, it is assumed that Newport News will be assigned some significant level of submarine overhaul and repair work to maintain select submarine construction skills, although not all pertinent skills can be preserved by this stratagem even when combined with nuclear carrier design and construction.

Before discussing the impact of competition, it is worth reviewing the major changes to the Electric Boat workforce and yard which will occur even under the current

Navy submarine acquisition plan. By the time the NSSN construction program would be competed, Electric Boat will have restructured and reengineered its processes, facilities, organization, and culture to affordably deliver nuclear submarines at the low production rates forecast.

Our workforce will shrink from its present level of just over fifteen thousand to approximately six thousand employees by early 1998, a level at which it would stabilize through 2001 with the current NSSN program schedule. Beyond 2001 the employment level will increase dependent on the NSSN procurement rate and outyear competition. The majority of the three thousand employees who will lose their jobs each year for the next three years will be skilled shipyard mechanics at both the Groton and Quonset Point facilities, along with the supervisory and support personnel directly associated with production. With the construction workload provided by SSN23, the critical mass of production personnel will still be intact and ready to apply the necessary knowledge, skills, and abilities to the NSSN. We will, however, be close to the level below which economic viability and retention of critical skills is considered assured, and further reductions caused by program delay or loss of work would have to be carefully considered.

Similarly, Electric Boat is consolidating and realigning its production facilities to suit the projected workload and the integrated design/build process. Two major satellite production facilities have already been shut down and sold. The leased property at Quonset Point will have shrunk back to the core manufacturing buildings. The shipyard at Groton will consolidate around the Land Level Ship Construction Facility and the waterfront shops, with peripheral areas out of service and older buildings demolished. Engineering and logistics personnel will have moved from leased offices in the Groton / New London area back into in-plant quarters. In short, we will have cut our fixed overhead in plant and equipment to match our reduced workload, in the process improving production flows and material storage and handling consistent with the design/build approach.

Electric Boat Wins

The first scenario is based on Electric Boat winning the competition for construction of the first NSSN. The assumptions above dictate that there would be minimal direct impact on the Electric Boat workforce, yard, and contractor-controlled cost element, although some level of disruption and delay is probable. For no impact to Electric Boat to be true, the government would have to absorb the costs associated with the second through fourth assumptions above. These costs would include:

- Award of design review contracts, at a cost which might range from the $10's of millions to the $100's of millions. Prior to and even subsequent to the decision to single-up design at Electric Boat, Newport News had been receiving conceptual design contracts of $10 million to $20 million per year, and some similar level of effort would result in an aggregate cost of between $30 million and $60 million between now and a competitive FY98 award.

- Navy program management and contract administration costs associated with running a competitive solicitation, as opposed to negotiating with a sole source. Electric Boat is not in a position to estimate this cost to the government, but believes it to be significant. The fact that both competitors would have to prepare a proposal would also add cost to the government, since Bid & Proposal is fully allowable under Federal Acquisition Regulations. Far more than the estimated $20 million expended on the Seawolf program competition might be expected.

- Costs associated with a slip in the NSSN integrated design and construction schedule. A critical corollary of the second assumption, that Electric Boat will proceed with the design *as if there were a single design/build contract,* is that critical path activities related to areas such as long lead material procurement, propulsion and reactor plant design and development, and advanced Weapons and CCS module construction activities, would all go forward as scheduled. It is not clear that this would be true, since if nothing else the introduction of a competitive environment would inhibit Navy participation and decision-making on design/build teams as is currently envisioned. Similarly, Electric Boat and the principal suppliers working on the design/build teams would be inhibited from freely sharing all proprietary information with the government and Newport News, since preserving a competitive advantage would be critical. Moreover, it is unlikely that certain pre-competitive award construction/development activities would be authorized at Electric Boat as scheduled if there was a risk that they would have to be transferred to or redone at Newport News. A rough estimate of the cost impact of, for example, a six month schedule slip is $50 million, while a one year delay could cost twice that.

- Costs associated with maintaining Newport News facilities anticipated to be required for NSSN. The possibility of reentering submarine construction as early as 1998, rather than when procurement rates increase after 2001, could lead Newport News to preserve (or fail to convert to alternate uses) capabilities and facilities which the NSSN would require. The costs associated with maintenance of these facilities and capabilities has been extrapolated from data in the RAND study at over $20 million, most of which would be absorbed as overhead in CVN contract rates.

- Transfer of significant overhaul and repair work to Newport News would, as Mr. O'Rourke pointed out, "include the direct change in cost to the government of having this work done at NNS rather than at a naval shipyard, and the indirect effects (due to changes in labor efficiency, materials costs, and allocation of overhead costs) on the other work performed at NNS and the naval shipyard." In addition to these costs, which Electric Boat is not in a position to quantify, there is an additional likely significant cost element. The current schedule of east coast submarine Selected Restricted Availabilities (SRAs) and Depot Modernization Periods (DMPs), and the schedules for all submarine refuelings on both coasts, is such that to transfer any significant amount of work to Newport News during their 1996 to 1999 hiatus in submarine construction would almost certainly result in closure of a naval shipyard, most probably Portsmouth. Again EB can not evaluate the cost of such a move, although 1993 BRAC estimates for closures of Mare Island and Charleston Naval Shipyards indicate one-time costs of $125 million to $400 million. Assuming that

Portsmouth Naval Shipyard would more closely resemble Mare Island in shutdown costs, a range of $100 million to $150 million is included here.

This list is not considered comprehensive, nor are the estimates more than starting points, but the minimum costs identified here, associated with a competitive Electric Boat win, are already significant, adding up to at least $220 million to $350 million:

- NNS design review contracts	$ 30 M to $ 60 M
- Competition administration (EB+NNS proposal only)	$ 20 M
- NSSN schedule slip	$ 50 M to $100 M
- NNS facility carrying costs	$ 20 M
- Transfer of sub overhaul and repair work	$100 M to $150 M

Competition, regardless of who wins, will add cost and risk to the NSSN program.

Electric Boat Loses

The second scenario is based on Electric Boat losing the competition for construction of the first and subsequent NSSNs. The initial assumptions regarding Navy actions to "level the playing field" continue to be applicable, as do all of the cost elements discussed above. In this case, there would clearly be a significant impact on the Electric Boat workforce, yard, and contractor-controlled cost element.

The primary impact of losing the competition for the first five NSSNs would be that Electric Boat would go out of business. Production would cease with delivery of the SSN23 in late 2001, and engineering and design would cease with transfer of the NSSN design to Newport News, presumably around the same time, based on an FY98 competitive NSSN construction award. Continued Electric Boat participation in the submarine technology development and life cycle support business can not be forecast accurately at this time.

The additional cost elements, over and above those related simply to "level playing field" competition, fall into the following major categories:

- Shutdown of Electric Boat. This cost element includes: the additional overhead absorption on the SSN23 and ongoing engineering contracts due to lack of NSSN work; physical shutdown of facilities; carrying costs until ultimate disposition of the property; and residual depreciation, environmental cleanup, and benefits/severance costs for some of which the government would remain liable. Electric Boat's rough estimate of these costs is $675 million.

- Reconstitution at Newport News. Despite the level playing field activity of transferring submarine repair work to Newport News, there will be costs to recreate specific submarine construction skills at Newport News. In addition based on recent press releases concerning conversion of the ring module shop, structural fabrication facility, and the land level construction ways to support construction of commercial tankers, there will be facility reconstitution costs. Extrapolating from the RAND study data, which covered the separate cases of Newport News workload plus either CVN76

or additional submarine overhaul work, indicates that costs of $30 million to $50 million are applicable.

- Systems and processes cost of Design Transfer. In order to take over the design and then build the NSSN, Newport News would need to either acquire and put in place the hardware, software, and procedures Electric Boat used for design and would have used for construction, or would have to develop the linkages and procedures to convert the design data and products to fit the existing Newport News systems. The government would also lose the benefit of a design certified by the designer to the builder. With all of the startup and interface difficulties either approach would require, and based on our experience with exchanging design data on the Seawolf program, Electric Boat believes this would cost $180 million to $230 million.

- Loss of learning and recovery at Newport News. As a result of the submarine production gap at Newport News, the production workforce would experience initial inefficiencies working in the unique submarine reliability and quality environment. In addition, the design and engineering force will have to recreate the learning which has already gone into the design development. $150 million to as much as $300 million is estimated to be required to cover these costs.

- Delay to the NSSN program. Award of the first NSSN construction contract to Newport News would impact the integrated design/build schedule currently in place. The time required to implement the necessary design transfer initiatives to start construction, as well as the requirement to reconstitute both facilities and workforce at NNS, would result in a delay to the NSSN program estimated at upwards of one to two years. This would affect the supplier base and retention/reconstitution costs, the overhead costs associated with program management and administration as well as construction support costs, and escalation costs. The cost associated with such a delay might approach $100 million to $200 million.

- Loss of future competition. After allowing for any price benefit on the first competed NSSN, it is none the less realistic to expect that once in a monopolistic position Newport News would negotiate for the highest possible profit margins. Throughout the existing submarine programs, and under the Navy's proposed acquisition strategy, the leverage of potential competition limits fee schedules. Even the Trident submarines, which were built exclusively by Electric Boat, were subject to competitive pressure, with three of the awards actually being competed. Considering that present Newport News CVN profit rates (17.9%) are nearly 50% greater than their SSN profit rates (12.2%), it is not unreasonable to expect that once Electric Boat ceased to be a source of potential competition, profit increases might add $100 million to $200 million to the total second through fifth NSSN cost.

- Technology Base impact. Electric Boat is the premier resource for submarine technology. Cessation of operations would require the transfer of the contracts and, to the extent possible, the knowledge resident at EB to alternate companies, naval laboratories, or academic institutions. Without more definitive assumptions about what would be transferred when and to whom, it is not appropriate to put a dollar value on this very significant cost item.

These costs, while approximate and far from comprehensive, add up to between $1.2 billion and $1.7 billion. When added to the $170 million to $250 million (omitting the delay cost) identified earlier with competition, the cost of this scenario would exceed $1.4 billion to $1.9 billion.

- Shutdown of Electric Boat	$675 M
- Reconstitution at Newport News	$ 30 M to $ 50 M
- Design transfer costs	$180 M to $230 M
- Loss of learning	$150 M to $300
- Delay to the NSSN program	$100 M to $200 M
- Loss of future competition	$100 M to $200 M
- Technology base impact	unknown

An Electric Boat competitive loss would add significant cost and technological risk.

Summary

In the case discussed here, with the specific assumptions about competitive environment and prerequisite activities, Electric Boat believes that the costs and risks of competition clearly outweigh any potential savings. Moreover, for any competitive scenario prior to the NSSN program reaching production rates which would support viable competition, the costs to "level the playing field", transfer design information, shut down and/or reconstitute facilities and workforces, etc., dictate that:

No matter who wins, competition will increase the cost of submarines over the foreseeable future.

From a financial and risk management standpoint, competition should be conducted in the NSSN program when and if it provides the most advantage to the government. The Integrated Product Process Development environment currently in place on the New Attack Submarine program necessitates lead ship construction at the lead design yard. GAO lessons learned on the Seawolf program show this to be the lowest cost approach, and it is consistent with other shipbuilding and aircraft building programs. Once the design is validated in production, then competition should occur when production rates support introduction of a second builder. Premature competition will drive up costs unnecessarily and risk permanent loss of Electric Boat. As long as it is not cost prohibitive, the retention of two nuclear shipyards retains the greatest flexibility for affordably adapting to future requirements.

CRS

Congressional Research Service • The Library of Congress • Washington, D.C. 20540-7000

March 29, 1995

TO : House National Security Committee
Attention: Steve Thompson

FROM : Ronald O'Rourke
Specialist in National Defense
Foreign Affairs and National Defense Division

SUBJECT : Framework of analysis for comparing costs of 2-yard and 1-yard strategies

This memorandum responds to the request made by Representatives Hunter and Skelton at the Military Procurement subcommittee hearing of March 16, 1995, as refined in our conversation of March 24, 1995, for CRS to provide a framework of analysis for comparing the relative costs of 2-yard (split) and 1-yard (consolidated) strategies for the future acquisition of nuclear-powered warships.

Under the 2-yard strategy -- the Administration's preferred strategy -- the Electric Boat Division (EB) of General Dynamics Corporation would build nuclear-powered submarines while Newport News Shipbuilding (NNS), a subsidiary of Tenneco, Inc., would build nuclear-powered aircraft carriers. Under the alternative 1-yard strategy, production of both kinds of ships would be consolidated at NNS.

SUMMARY OF MAIN POINTS

The following are the main points of the memorandum:

- The Administration has never argued that the 2-yard strategy would be less expensive overall than the 1-yard strategy. Instead, it has argued that the 2-yard strategy is preferable in terms of preserving competition and mitigating risk to the nuclear-warship industrial base. An additional argument that can be considered is the scenario of returning to a submarine production rate of more than 3 boats per year. If the analysis shows the 1-yard strategy to be less expensive, a full consideration of the relative merits of the 2-yard and 1-yard strategies might then weigh cost considerations against competition, risk mitigation, and the scenario of producing submarines at a rate of more than 3 boats per year.

- The 1994 RAND report on the submarine production base, though thorough and helpful on many questions, does not directly address the issue of the relative overall costs of the 2-yard and 1-yard strategies. It also does not address the scenario in which NNS reconstitutes submarine construction after receiving both carrier construction work (CVN-76) and submarine overhaul and repair work -- the scenario on which NNS officials have based their reconstitution presentations to Congress.

- Decisions with longer-term cost implications arguably should not be based solely or primarily on shorter-term cost considerations. Although the Navy has suggested in recent communications that the analysis should focus solely or primarily on cost effects in the shorter term (i.e., the years of the FYDP), Congress' decision on this issue will have recurring longer-term cost consequences. Congress' decision therefore arguably should be based on an examination of both shorter- and longer-term cost consequences. Restricting the analysis to either shorter-term or longer-term cost consequences could skew the results.

- The relative overall costs of the 2-yard and 1-yard strategies will reflect not just cost effects on submarine construction, but cost effects on other work for the government done at EB and NNS, such as submarine overhaul and repair work; carrier construction, refueling, overhaul and repair work; and other surface ship construction and repair work. The analysis therefore arguably should include the calculated cost impact on all work done for the government at EB and NNS, and not just submarine construction work.

- The relative costs of the 2-yard and 1-yard strategies could depend in part on the out-year procurement rate of the NSSN. To understand the sensitivity of the analysis to changes in the out-year procurement rate, the analysis could examine at least two out-year rates -- 2 boats per year and 1.5 boats per year -- since both rates have been mentioned in Navy testimony. A third out-year production rate -- 1 per year -- might also be examined, given the possibility that fiscal limitations might limit the out-year rate to something closer to 1 per year.

- The relative costs of the 2-yard and 1-yard strategies could also depend on the amount of work other than submarine construction work at NNS. To understand the sensitivity of the analysis to changes in the amount of non-submarine-construction work at NNS, the analysis could examine two or three scenarios representing differing levels of non-submarine-construction work at NNS.

- The difference in costs between the 2-yard and 1-yard strategies will be the net result of a variety of shorter- and longer-term cost effects. Net cost effects can be presented on a year-by-year basis for the entire period in question, and cumulatively for each year and all preceding years, in both constant and discounted dollars. More than one

discount rate can be used to capture differing views on the best discount rate and to illustrate the sensitivity of the analysis to changes in the discount rate.

- The analysis would require some time and effort. Given the importance of this issue and the possibility that a decision, once implemented, might not be easily reversed, Congress needs a solid study, not one hastily done or a "back of the envelope" calculation whose results might prove to be significantly in error.

- Given its experience in making and reviewing cost estimates, the Congressional Budget Office arguably should be included along with the Congressional Research Service and the Government Accounting Office in independently reviewing and commenting on the work done by the Administration, EB, and NNS, all of whom have a strong stake in the issue. The efforts of all three legislative support agencies may be needed to complete the work in the time allowed.

- Given the level of Congressional interest in the issue, it is possible that other committees or Members might express an interest in this question. Consideration might be given to having this analysis become a common analysis for all committees and Members interested in the issue.

COST vs. OTHER CONSIDERATIONS

Although the Administration states that it is taking various steps to ensure that its preferred 2-yard strategy will be implemented at the lowest possible cost, it has never argued that the 2-yard would be less expensive overall than the 1-yard strategy. Instead, as noted in its October 1993 report on the Bottom-Up Review (BUR) of U.S. defense policy, it has argued that the 2-yard strategy is preferable primarily in terms of preserving competition and mitigating risk to the nuclear-warship industrial base.[1]

An additional argument that can be considered is the scenario of returning to a submarine production rate of more than 3 boats per year. This issue is briefly discussed in my formal written statement to the committee for the March 16 hearing.[2] If the analysis shows the 1-yard strategy to be less expensive, a full consideration of the relative merits of the 2-yard and 1-yard strategies might then weigh cost considerations against competition, risk mitigation, and the scenario of producing submarines at a rate of more than 3 boats per year.

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[1] U.S. Department of Defense. Report on the Bottom-Up Review. Washington, 1993. (Les Aspin, Secretary of Defense, October 1993) p. 53, 56, 57.

[2] Statement of Ronald O'Rourke, Specialist in National Defense, Congressional Research Service, Before the House National Security Committee Subcommittee on Military Procurement Hearing on Submarine Acquisition Issues, March 16, 1995. p. 15, 17.

LIMITATIONS OF RAND REPORT

At present, the most thorough independent study of the submarine construction industrial base is the 1994 RAND report entitled *The U.S. Submarine Production Base: An Analysis of Cost, Schedule, and Risk for Selected Force Structures.*[3] Although this report is thorough and helpful on the many questions it addresses, no report of manageable length could cover every aspect of the issue, and the RAND report has certain limitations in scope. In particular, the RAND report, which responded to specific tasking from the Office of the Secretary of Defense, does not directly address three issues of potential interest to Congress.

The first of these is the primary issue under consideration here -- the relative overall costs of the 2-yard and 1-yard strategies. The report examines separate reconstitution costs at EB and NNS, and presents information on production rates if submarines are produced at two yards rather than one. But it does not look at the overall cost to the government of having nuclear warships produced at 2 yards vs. 1.

The second issue it does not address is the scenario in which NNS reconstitutes submarine construction at the end of the 1990s after receiving both carrier construction work (CVN-76) and submarine overhaul and repair work. The study looks only at scenarios where NNS has one form of work but not the other. The omission of the scenario where NNS has both forms of work simultaneously is potentially significant, because NNS officials have based their presentations to Congress on this scenario, and not on the scenario of having only one form of work or the other. The RAND report provides estimates of how the cost of reconstituting submarine construction work at NNS is reduced if NNS has either form of work. But it does not provide an estimate of how these costs might be further lowered if NNS has both forms of work. The report thus cannot serve as an independent source of information for this particular part of the analysis.

Third, the report examines only one option for providing EB with submarine construction work (as opposed to submarine overhaul and repair work) as a bridge to the start of NSSN production, namely, construction of SSN-23. It does not examine other options for providing submarine construction work, such as building only a portion of SSN-23, building special-mission hull sections for backfitting into existing SSN-688s, or building 1 or 2 additional Improved SSN-688 class submarines.[4] The report thus cannot serve as an

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[3] Birkler, John, et al. The U.S. Submarine Production Base: An Analysis of Cost, Schedule, and Risk for Selected Force Structures. RAND, Santa Monica, CA, 1994. (National Defense Research Institute, Prepared for the Office of the Secretary of Defense, MR-456-OSD) 203 p.

[4] These three options are discussed briefly in Statement of Ronald O'Rourke, op. cit., p. 17-18. In connection with the option of building only a portion of SSN-23, it can be noted that in a report by the office of the Assistant Secretary of the Navy (Research, Development and Acquisition) dated July 10,

independent source of information on the costs of these options or on the question of whether building SSN-23 represents the most cost-effective form of submarine-construction work for bridging EB to the start of NSSN production.

SHORTER- AND LONGER-TERM COST CONSEQUENCES

The Navy in recent communications to the Committee and CRS has suggested that the analysis should focus on or be limited to shorter-term cost effects (i.e., those in the years during the FYDP). Congress' decision on this issue, however, will have recurring longer-term cost consequences and might prove to be permanent. Indeed, a principal argument in favor of the 1-yard strategy is the potential for achieving recurring economies in the long run by having nuclear warships bear the fixed costs of only 1 nuclear warship yard rather than 2.

Limiting the analysis to shorter-run cost effects will capture the potential transitional costs of switching planned NSSN production from EB to NNS and the potential NSSN production savings (due to economies of scope) that NNS might achieve (relative to the Administration's plan) during the NSSN production startup period when the procurement rate will be less than 1 boat per year. It will not, however, capture the longer-run relative difference in production costs, whatever it may be, during the planned subsequent period of NSSN steady-state procurement, when the procurement rate is to be more than 1 boat per year. This longer-term cost effect might prove to be a more significant factor in the overall cost calculation than shorter-term costs.

Decisions with longer-term cost implications arguably should not be based solely or primarily on shorter-term cost considerations. Indeed, if the Administration had focused only on short-term costs in deciding whether to stop Seawolf procurement and shift to the NSSN design, it might have been more inclined to decide in favor of continuing to procure the Seawolf design, since, as pointed out by the NSSN COEA, the NSSN's up-front RDT&E and detailed design costs of about $4.5 billion and the relatively high production costs of the

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1992 and entitled *Preservation of the Industrial Base for Nuclear-Powered Submarine Systems*, "A number of options were considered, short of full submarine construction, to aid the critical submarine vendor and shipbuilder industrial bases. Areas investigated included building submarine components to maintain the critical vendor base, building full sections of submarines (propulsion plant spaces) and directing nuclear submarine refueling overhauls to Electric Boat and Newport News Shipbuilding. Assisting the submarine construction and vendor bases can preserve the essential, unique capabilities needed to timely reconstitute our submarine forces, but it is not an effective approach considering the components/partial submarines produced have only marginal value." U.S. Department of the Navy. Assistant Secretary of the Navy (Research, Development and Acquisition). Preservation of the Industrial Base for Nuclear-Powered Submarine Systems, Fall Update. Washington, 1992. (November 1992) p. 2-3. The option of building SSN-688 hull sections is proposed in Polmar, Norman. There Are Alternatives to the Third Seawolf. U.S. Naval Institute Proceedings, March 1995. p. 121-122.

first 3 or 4 NSSNs on the NSSN learning curve are not overcome by the lower production costs of follow-on NSSNs until a total of more than 10 NSSNs is procured.[5]

In light of these considerations, Congress' decision arguably should be based on an examination of both shorter- and longer-term cost consequences. Restricting the analysis to either shorter-term or longer-term cost consequences could skew the results.

COST EFFECTS ON ALL WORK DONE AT EB AND NNS

The relative overall costs of the 2-yard and 1-yard strategies will reflect not just cost effects on submarine construction, but on other work for the government done at EB and NNS, such as submarine overhaul and repair work; carrier construction, refueling, overhaul and repair work; and other surface ship construction and repair work. An analysis that examines only the cost impact on submarine construction work will not capture indirect cost effects on other forms of work for the government due to changes in things such as materials costs and reallocation of fixed overhead costs. The analysis therefore arguably should include the calculated cost impact on all work done for the government at EB and NNS, and not just submarine construction work.

OUT-YEAR PROCUREMENT RATE OF NSSN

The relative costs of the 2-yard and 1-yard strategies could depend in part on the out-year procurement rate of the NSSN. For example, the rate would presumably affect the relative amounts of fixed cost allocated to each boat under the 2-yard or 1-yard strategy. It might also affect the relative costs of materials, or perhaps even certain aspects of labor efficiency.

To understand the sensitivity of the analysis to changes in the out-year procurement rate, the analysis could examine at least two out-year rates -- 2 boats per year and 1.5 boats per year -- since both rates have been mentioned in Navy testimony. A third out-year production rate -- 1 per year -- might also be examined, given the possibility that fiscal limitations might limit the out-year rate to something closer to 1 per year.[6]

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[5] For the unclassified conclusion of the NSSN COEA, see statement of Ronald O'Rourke, op. cit., p. 23 and 25. The independent NSSN study group -- the so-called Reynolds panel -- similarly noted that "The case for continued SSN-21 production hinged upon [the] near term non-recurring cost of [the] NSSN." Reynolds, J. Guy. New Attack Submarine (NSSN) Independent Characteristics Review: Speed, Signature, Payload, Combat Systems, and Cost Trade-offs. Washington, 1994. (Prepared for the Assistant Secretary of the Navy for Research, Development, and Acquisition, May 1994, Unclassified Version) p. 13.

[6] For a brief discussion of the potential affordability of the NSSN at different procurement rates, see Statement of Ronald O'Rourke, op. cit., p. 21-22. This discussion is based in turn on U.S. Library of Congress.

NON-SUBMARINE-CONSTRUCTION WORK AT NNS

The relative costs of the 2-yard and 1-yard strategies could also depend on the amount of work other than submarine construction work at NNS. As with the above issue of the out-year procurement rate of the NSSN, the amount of non-submarine construction work at NNS could affect relative amounts of fixed cost allocated to each boat under the 2-yard or 1-yard strategies, the relative costs of materials, or perhaps even certain aspects of labor efficiency.

To understand the sensitivity of the analysis to changes in the amount of non-submarine-construction work at NNS, the analysis could examine two or three scenarios representing differing levels of non-submarine-construction work at NNS. These levels would take into account potential amounts of several non-submarine-construction forms of work, including but not necessarily limited to the following: submarine refueling, overhaul and repair work; carrier construction, refueling, overhaul and repair work; other U.S. Navy surface ship construction or overhaul and repair work; construction or overhaul and repair of foreign-navy warships, and construction or overhaul and repair of commercial ships.

COST EFFECTS TO BE CONSIDERED; DISPLAYING RESULTS

Cost Effects to be Considered

The difference in costs to the Federal government between the 2-yard and 1-yard strategies will be the net result of a variety of shorter- and longer-term cost effects. Shorter-term cost effects are primarily the transitional effects of switching from the Administration's 2-yard strategy to the alternative 1-yard strategy. Longer-term cost effects are primarily the recurring cost effects associated with performing the work in question at 1 yard rather than 2.

Shorter-term cost effects

The shorter-term (transitional) cost effects of choosing the 1-yard strategy rather than the Administration's preferred 2-yard strategy could include (but may not be limited to) the following:

- **SSN-23 not funded.** This would include not approving about $1.5 billion in FY1996 funding to complete funding for SSN-23 and the recovery of any unexpended portions of the roughly $920 million in prior-year funding available for SSN-23, following payment of contract cancellation fees.

- **Supporting or reconstituting component sources.** This includes the costs of supporting component vendors that were to have been supported by SSN-23 or reconstituting these sources at a later point

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Congressional Research Service. Navy New Attack Submarine (NSSN) Program: Is It Affordable? CRS Report 94-643 F, by Ronald O'Rourke. Washington, 1994. (August 9, 1994) 6 p.

either as independent vendors or as in-house NNS manufacturing capabilities. Much of the prior-year funding for SSN-23 is being used to purchase components for SSN-23. Carrying out some or all of these contracts might be less expensive than canceling them, paying cancellation fees, and then incurring separate costs to otherwise support or reconstitute these component sources. The analysis should reflect the lowest-cost approach for supporting or reconstituting component sources.

- **Submarine close-down at EB.** This would include any costs which the Federal government would be obligated to pay as a result of the permanent closing down of submarine production at EB. If these costs are defined to include Federal payments to displaced EB submarine construction workers, then the calculation arguably should also include the avoidance of such payments to a similar group of NNS workers who would lose their jobs if submarine construction work at NNS ends, as under the Administration's 2-yard plan.[7] If it is agreed that the end of submarine production at EB would lead to the complete closure of EB, then the calculation would include any costs that the government would be obligated to pay as a result of the closure of the yard, including the costs of transferring to another location EB's current functions as a reactor plant planning yard and a class planning yard.

- **Avoidance of submarine shut-down at NNS.** This includes the avoidance of any costs which the Federal government would have been obligated to pay as a result of shutting down the submarine production facility at NNS in a manner that preserved an option, as called for under the Administration's plan, to reconstitute submarine production at NNS at some later point for purposes of generating competition or meeting a need for building more than 3 submarines per year.

- **Completing current contracts at EB.** This includes the cost impact on contracts currently in progress at EB to build new

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[7] At the March 16 hearing, Representative Abercrombie discussed the potential employment effects of choosing a 2-yard or 1-yard strategy. There are currently two shipyard submarine design and construction work forces, one at EB and one at NNS, each composed of several thousand construction workers plus hundreds of additional designers and engineers. In the future, there is to be only one such work force. The primary employment-related question is location of this work force -- if the one at EB is retained, the one at NNS will be eliminated, and vice versa. (There are also some executive and central administrative positions at EB that might not be transferred to NNS under the 1-yard strategy.) In judging the socio-economic merits of whether the shipyard submarine design and construction work force should be located at EB or NNS, one can consider the regional employment effects of decisions on other defense programs, decisions on non-defense Federal programs, and general economic conditions in the two regions.

submarines or overhaul and repair existing submarines. Cost effects could include effects on labor costs, labor efficiency, materials costs, and overhead costs.

- **Transferring and altering NSSN design.** This includes the costs to transfer NSSN design data from EB's computer design system to NNS' computer design system, to develop among NNS' designers an understanding of the NSSN design comparable to that of EB's designers, to remove from the NSSN design features meant to optimize the design for EB's unique production processes and methods, and to insert into the NSSN design new features meant to reoptimize the design for NNS' unique production processes and methods.

  If this leads to a delay in the start of NSSN procurement beyond FY1998, then other transitional cost effects, such as supporting or reconstituting component sources or transferring submarine overhaul and repair work to NNS (see below), would have to be calculated accordingly. Due to the potential effects of a delay on other costs in the analysis, it would appear that an agreement should be reached early in the analysis as to whether transferring and altering the NSSN design will cause a delay in the start of NSSN procurement to FY1999 or some later year. If the start of procurement is delayed to FY1999, this can be accommodated within the FYDP by moving the lead boat to FY1999 and the second boat to FY2001. The third boat could still be procured in FY2002.

- **Transferring submarine overhaul/repair work to NNS.** This includes the direct change in cost to the government of having this work done at NNS rather than at a naval shipyard, and the indirect effects (due to changes in labor efficiency, materials costs, and allocation of overhead costs) on the cost of other work performed at NNS and the naval shipyard.

Longer-term cost effects

As with shorter-term cost effects, longer-term cost effects to the government of a 2-yard or 1-yard strategy are not limited to submarine construction and cannot be fully understood by focusing solely on that one form of work. Accordingly, recurring cost effects should be calculated to include the net change in cost to all forms of work for the government that may be affected by a decision in favor of a 2-yard or 1-yard strategy. This includes submarine construction work; submarine refueling, overhaul and repair work; carrier construction and overhaul and repair work; and other surface ship construction and repair work.

The longer-term (recurring) cost effects of choosing the 1-yard strategy rather than the Administration's preferred 2-yard strategy, could include (but may not be limited to) the following:

- **Cost of capital.** The cost of capital to EB and NNS under the 2-yard strategy might differ from the cost of capital to NNS under the 1-yard strategy.

- **Cost of labor.** Bargaining conditions between management and the work force over wages and benefits at EB and NNS under the 2-yard strategy might differ from those at NNS under the 1-yard strategy. This could lead to a differential between the two strategies in the area of wages and benefits.

- **Productivity of labor.** The need to move workers from one form of work to another, or opportunities for doing so, may differ under the 2-yard and 1-yard strategies. This could lead to a differential between the two strategies in the area of overall labor productivity.

- **Cost of materials.** The degree of efficiency with which materials may be ordered by EB and NNS under the 2-yard strategy may differ from the degree of efficiency with which materials might be ordered by NNS under the 1-yard strategy.

- **Overhead costs.** A principal argument made by those in favor of the 1-yard strategy is that the various forms of work performed would bear the fixed overhead costs of 1 nuclear shipyard rather than 2. The 1994 RAND study estimated the annual fixed overhead costs of a notional nuclear submarine production facility at $50 million to $150 million.[8]

Displaying Results

Net cost effects could be presented on a year-by-year basis for the entire period in question, and cumulatively for each year and all preceding years, in both constant and discounted dollars. The period covered arguably should be long enough to capture recurring cost effects and provide an indication of whether and when there would be a break-even point between the 2-yard and 1-yard strategy. One possibility would be to include 10 years of steady-state production of the NSSN (i.e., out to FY2012). More than one discount rate can be used to capture differing views on the best discount rate and to illustrate the sensitivity of the analysis to changes in the discount rate.

The blank notional table on the next page shows what such a display might look like. One such table could be prepared for each scenario, the scenarios being defined by a steady-state NSSN procurement rate (2, 1.5 and possibly 1 boat per year) and a level of non-submarine-construction work at NNS (relatively higher, relatively lower, and possibly intermediate). A total of 4, 6, or 9 tables might thus be generated. The short names of the line items in the 1-yard section of the table refer to the potential cost effects discussed earlier in this section.

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[8] The U.S. Submarine Production Base, op. cit., p. 183.

Funding	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12
2-yard strategy -- funding for:																	
Work at EB																	
Work at NNS																	
Total																	
1-yard strategy -- changes from annual totals above due to:																	
No SSN-23																	
Components																	
EB close																	
No NNS shut																	
EB contracts																	
NSSN design																	
NNS sub OH																	
Capital cost																	
Labor cost																	
Labor prod.																	
Mat'l Cost																	
Overhead																	
Total ($FY9X)																	
Cum. ($FY9X)																	
Cum. (disc. X%)																	
Cum. (disc. Y%)																	

TIME AND EFFORT FOR THE ANALYSIS

This analysis would require some time and effort. Given the importance of this issue and the possibility that a decision, once implemented, might not be easily reversed, Congress needs a solid study, not one hastily done or a "back of the envelope" calculation whose results might prove to be significantly in error.

The need for the Committee to act on the Administration's proposed FY1996 defense budget might require a time line for doing the analysis on the order of perhaps a few weeks. Given the cost information and prior cost analyses on related issues already available to the Navy and the shipbuilders, a period of a few weeks might be sufficient to generate a rough-order-of-magnitude (ROM) analysis or perhaps something a little more refined.

A more refined cost analysis would be preferable, but might take more time than the Congressional schedule might permit. A ROM analysis, however, would provide at least some information to inform the Committee in its work. This contrasts with the current situation, in which the Committee has only NNS' preliminary submission and some Navy reactions to it -- information that may lack a systematic analytical framework and which may only focus on certain types of costs at the expense of others.

PARTICIPATION OF CBO

Given its experience in making and reviewing cost estimates, the Congressional Budget Office arguably should be included along with the Congressional Research Service and the Government Accounting Office in independently reviewing and commenting on the work done by the Administration, EB, and NNS, all of whom have a strong stake in the issue. Indeed, CBO included the 1-yard strategy in the 1995 edition of its annual report on options for reducing the Federal budget deficit.[9] Given the differing areas of responsibility of the three Congressional support agencies, each could bring a different perspective to the task of reviewing and commenting on the work done by the Administration, EB, and NNS. The efforts of all three legislative support agencies, moreover, may be needed to complete the work in the time allowed.

OTHER INTERESTED CONGRESSIONAL PARTIES

Given the level of Congressional interest in the issue, it is possible that other committees or Members might express an interest in this question. Consideration might be given to having this analysis become a common analysis for all committees and Members interested in the issue.

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[9] U.S. Congress. Congressional Budget Office. Reducing the Deficit: Spending and Revenue Options. Washington, 1995. (A Report to the Senate and House Committees on the Budget, As Required by Public Law 93-344, February 1995) p. 31-32.

DEPARTMENT OF ENERGY NATIONAL SECURITY BUDGET REQUEST FOR FISCAL YEAR 1996

HOUSE OF REPRESENTATIVES,
COMMITTEE ON NATIONAL SECURITY,
MILITARY PROCUREMENT SUBCOMMITTEE,
Washington, DC, Wednesday, March 29, 1995.

The subcommittee met, pursuant to call, at 9:30 a.m. in room 2212, Rayburn House Office Building, Hon. Duncan Hunter (chairman of the subcommittee) presiding.

STATEMENT OF HON. DUNCAN HUNTER, A REPRESENTATIVE FROM CALIFORNIA, CHAIRMAN, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. HUNTER. The subcommittee will come to order.

We meet this morning to receive testimony on the Department of Energy's budget request for fiscal year 1996. As my colleagues are aware, the National Security Subcommittee has sole jurisdiction over authorization and responsibilities for approximately $11 billion of DOE's total budget request of $16.6 billion. More than half of this amount under our jurisdiction pertains to environmental cleanup activities, which is not the subject of today's hearing.

That challenging subject will be addressed in a subsequent hearing. This morning we will review the DOE's request for just under $5 billion for national security activities under its purview. These important activities include ensuring the safety, reliability and performance of United States nuclear weapons, arms control and disarmament activities in Russia, North Korea, and elsewhere, providing nuclear reactors for United States Navy vessels, intelligence assessments of extant and emerging nuclear programs, worker and community transition assistance, and more.

I have serious concerns about this administration's commitment to maintaining U.S. nuclear competence over the long term. This or any other administration has a solemn responsibility to ensure that the weapons in the U.S. nuclear stockpile are safe, reliable, and effective. And yet the policies this administration has pursued and continues to pursue in my judgment amount to a willful neglect of those weapons and serve as the foundation of our national security strategy.

Consider the following. First, the administration is committed to concluding negotiations on a comprehensive test ban at the earliest possible date. But a test ban is unverifiable and it will not stop rogue regimes from achieving nuclear weapons capability. It will, however, tie the hands of U.S. scientists and engineers who are responsible for ensuring the safety, reliability, and performance of United States nuclear weapons.

Second, by its own admission the administration's approach to retaining core nuclear competencies will not provide the same degree of confidence in U.S. nuclear weapons that we had with nuclear testing. The Department of Energy [DOE] science-based stockpile stewardship program will take the better part of a decade or more to put in place, and even then success is not assured.

In addition, I worry that the Department's focus on science will weaken the focus on weapons performance and that building a massive science edifice will instill a false sense of confidence in U.S. nuclear weapons.

Third, the administration is woefully underfunded, even as a scaled-back stewardship program. The President's fiscal year 1995 budget request was a quarter of a billion dollars less than the President said need to be spent on stewardship and a classified Presidential decision directive. This year's budget request for stewardship, although an increase over last year, is once again more than $200 million short.

Fourth, DOE is spending scarce defense program funds on programs that have little if any direct bearing on the nuclear mission such as the clean car initiative.

Fifth, DOE is falling farther and farther behind in developing plans for a tritium resupply source. We are still talking about technological options, siting options and timing options. But an option will not refillet tritium reservoir. Only tritium will.

Plus, our tritium resupply plants are premised on ratification by Russia of the START II Treaty. But assuming START II doesn't enter into force, which may be a more accurate prediction in light of the uncertain political climate in Russia, the DOE's plans are totally unresponsive to the requirement.

Sixth, we see a department and nuclear infrastructure in turmoil. Will there be a Department of Energy in 12 months? In 2 years? No one knows. Will there be two or three weapons labs? I don't know the answer to that question.

But I do know this. The national security strategy document just released by the Joint Chiefs states, and I quote, the highest priority of our military strategy is to deter nuclear attack against our Nation and our allies. Our survival in the freedom of action we need to protect extended national interest depend upon strategic and nonstrategic nuclear forces and their associated command and control.

I agree with that statement. But if our very survival depends upon maintaining safe, reliable, and effective nuclear weapons, then why is the administration willing to tolerate less than full competence in the safety, reliability, and effectiveness of those weapons?

To help us better understand these issues, we are pleased to have before us today several distinguished witnesses. The witnesses in our first panel are Mr. Charles Curtis, the Under Secretary of Energy; Dr. Harold Smith, Jr., the Assistant to the Secretary of Defense for Atomic Energy; Dr. Vic Reis, the Assistant Secretary of Energy for Defense Programs; and Mr. Kenneth Baker, Director of DOE's Office of Nonproliferation and National Security.

Gentlemen, welcome to our hearing today. After we have completed questioning this panel, we will turn to a panel of the directors of the three weapons laboratories, and I will introduce these gentlemen later.

Before turning to Mr. Curtis, let me turn to the ranking Democrat on the subcommittee, the distinguished gentleman from Missouri, Mr. Skelton, for any comments he deems appropriate at this time.

Mr. SKELTON. Mr. Chairman, you have more than covered the waterfront. I think we should proceed with our hearing. I welcome the witnesses.

Mr. HUNTER. I thank the gentleman. Mr. Curtis, the floor is yours, followed by Mr. Smith.

STATEMENT OF CHARLES CURTIS, UNDER SECRETARY OF ENERGY

Mr. CURTIS. Thank you, Mr. Chairman.

I too welcome the opportunity to appear before the committee with my colleagues to discuss these issues of mutual concern to the Nation. I have a lot of confidence in the hearing process as a means of determining the true circumstances of the condition of the stockpile and the nature of this administration's management of its stewardship responsibility.

I recognize fully that it is our responsibility to demonstrate that confidence to this committee as representatives of the American people, and I look forward to that task.

I am reminded in this respect of Mr. Skelton's origins from Missouri being from the show me state. We intend to show you. That is true.

Mr. Chairman, I have a formal statement that I would like to submit for the record.

Mr. HUNTER. Without objection, and all statements will be taken into the record. You are free to give the essence or summary of your statement.

Mr. CURTIS. I would like to offer only a few comments on the challenges that confront the Department in the area of national security. As the committee well knows, the nuclear weapons stockpile is undergoing dramatic change, a change thanks to breakthrough arms control agreements between the United States and the former Soviet Union.

These changes in the international environment have resulted in significant changes in the way the Department conducts its operations. Since 1992, the last year of President Bush's administration, development and production of new nuclear weapons has been halted. Portions of the former weapons production complex no longer needed to support a much smaller enduring stockpile have begun to close.

We have been engaged over the past several years in a substantial, and, we hope, careful downsizing. Perhaps most significantly, a new responsibility has now passed to the Department, the responsibility to ensure the continued safety, security, and reliability of the enduring stockpile without nuclear testing and in the absence of any active weapons production program.

This is a twin challenge. It challenges our technical and scientific capabilities in a very significant way. This challenge will test our core intellectual competencies and it will place a priority demand on resources in times of increasing fiscal stringency.

The Department has requested $3.5 billion in fiscal year 1996 to carry out its stockpiled stewardship and management responsibilities. This represents an increase of some $300 million, a 9 percent increase over the amounts appropriated for fiscal year 1995.

We believe the fiscal year 1996 request for defense programs represents a responsible and necessary level of funding for the important activities associated with transitioning the Department to meeting the challenges of science-based stockpile stewardship.

However, let me assure this committee that we recognize that in the next several years we must meet our important defense responsibilities while maintaining fiscal discipline. Accordingly, we have worked hard and will continue to work on initiatives designed to eliminate duplication of effort between agencies and within DOE to streamline operations and generate meaningful cost savings.

One such initiative that you have recently heard about is the comprehensive review of the DOE laboratory system undertaken by Bob Galvin. The Galvin task force chartered last year by Secretary O'Leary has delivered a report that challenges the department and the laboratories to reach new levels of performance and efficiency in meeting this Nation's demands.

We intend to and are already acting to aggressively address the task force recommendations, the overwhelming majority of which we agree with.

Mr. Chairman, I have brought with me today for introduction in the record the report of the Department of Energy submitted to the National Science and Technology Council that responds to the Galvin task force directive. It contains an appendix that summarizes each of the 28 recommendations of the Galvin task force and sets out very firm, explicit commitments with due dates of our implementation activities. I offer that for the record for the committee's consideration.

Mr. HUNTER. Without objection.

[The following information was received for the record:]

Report of the Department of Energy

for the

Interagency Federal Laboratory Review

in response to

Presidential Review Directive/NSTC-1

March 8, 1995

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I. Introduction

On February 2, 1994, the Department of Energy initiated the first post-Cold War review of its ten largest laboratories. To conduct this review, the Secretary of Energy established the Task Force on Alternative Futures for the Department of Energy National Laboratories. Bob Galvin, Chairman of the Executive Board of Motorola, was selected to serve as the Chairman of the Task Force, which was organized under the auspices of the Secretary of Energy Advisory Board. The overall objective of the study, as stated in its Terms of Reference, was "to examine options for change within these laboratories and to propose specific alternatives for redirecting the scientific and engineering resources of these institutions toward the economic, environmental, defense, scientific, and energy needs of the nation." The Secretary requested that the study be completed within one year.

On May 5, 1994, Dr. Jack Gibbons, Assistant to the President for Science and Technology, signed a Presidential Review Directive which provided the framework for a multi-agency laboratory review. Specifically, Presidential Review Directive/NSTC-1 was issued for the purpose of evaluating and developing "recommendations for ways to improve the efficiency and effectiveness of the Federal R&D investment in the Federal Government's three largest laboratory systems." The Department of Energy, Department of Defense, and National Aeronautics and Space Administration each were instructed to review their laboratories, particularly in relation to their effectiveness and comparative advantages in responding to evolving national needs. The major categories of national need to be considered were: fundamental science, national security, technologies that contribute to competitive performance of U.S. industry, environmental protection, and space exploration.

The Department of Energy's submission in response to the Presidential Review Directive includes three elements:

1. Report of the Task Force on Alternative Futures for the Department of Energy National Laboratories (commonly known as the "Galvin Task Force Report.")

2. A volume of White papers prepared by the Department of Energy in September 1994 at the request of the Galvin Task Force (Volume II of the Galvin Report)

3. This summary document, which provides a response by the Department of Energy to observations and recommendations contained in the Galvin Task Force.

The Department believes that these three submissions to the National Science and Technology Council represent a compelling validation of the purpose behind Presidential Review Directive/NSTC-1. The Galvin Task Force report is a landmark examination of the Department of Energy's National Laboratories. The Volume II White Papers include valuable information about the National Laboratories, including comprehensive data about the core technical capabilities of the labs. Additionally, through our response to the Galvin Report, the Department is demonstrating that it intends to use this examination as an instrument for change. In so doing, we intend to meet the President's goal, as stated in the Presidential Review Directive, of improving the efficiency and effectiveness of these R&D institutions in meeting current and future national needs

II. The Galvin Report in Perspective of other DOE Initiatives

The past two years have been an intense period of internal reform, organizational change, and fundamental rethinking at the Department of Energy. Never in the history of the Department has such an ambitious set of initiatives been pursued for the purpose of improving the performance, cutting costs, and fundamentally reshaping our business activities. Six separate yet overlapping initiatives -- of which the Galvin Task Force is one -- have served as the embodiment of our desire to create a new Department of Energy. (See Figure 1)

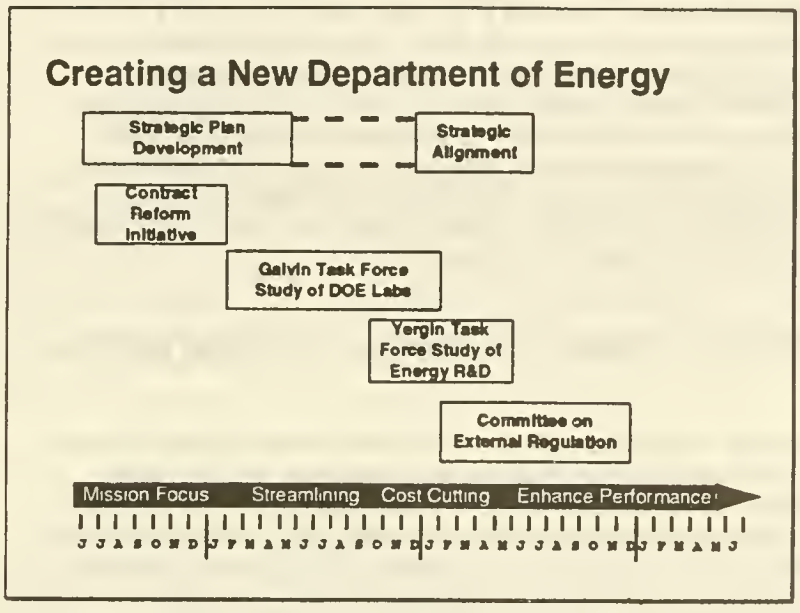

Figure 1: Creating a New Department of Energy

A. Strategic Plan: Fueling a Competitive Economy

In the spring of 1993, we initiated the most comprehensive strategic planning effort ever undertaken by the Department. Through a lengthy and intensive process involving hundreds of employees from all parts of the Department, its laboratories and facilities, a strategic plan was developed which presents a shared vision for the Department into the 21st Century. Through this process, we achieved broad recognition of the centrality of the Department's science and technology programs to

successful execution of all our missions. As a result of the plan, it became increasingly clear to all that the DOE laboratories provide our primary capacity for mission accomplishment. In addition, we sharpened the strategic focus and priorities for our core missions in energy, national security, environment, and fundamental science, and we resolved that the impact of these missions on industrial competitiveness was a critical success indicator.

B. Strategic Alignment

The Strategic Alignment initiative represents Phase-II of our strategic planning process, and is expected to introduce some of the most dramatic changes in the way the Department conducts its business since the DOE was established in 1977. This intensive 120-day effort will culminate on April 29, 1995, with recommendations on how to minimize layers and complexity of management in the Department, eliminate unnecessary and redundant functions, reduce the cost of DOE programs, restructure the Department, and align our organization with the Strategic Plan--so as to better serve our customers. The Strategic Alignment process is one of the mechanisms for implementing recommendations of the Galvin Task Force. The Department is committed to saving $2.8 billion from efficiency improvements and cuts to lower priority programs over five years through Strategic Alignment.

C. Contract Reform: Making Contracting Work Better and Cost Less

Through our contract reform initiatives, begun in spring 1993, we have made enormous strides in carrying out the missions of the Department at lower cost and with fewer employees. This effort has consisted of an intensive examination of how we managed and what we expected from the management and operations (M&O) contractors of the Department's numerous labs and facilities. In June 1993, we established a Contract Reform Team, under the leadership of Deputy Secretary Bill White, to develop a plan for significantly improving the Department's contracting practices. The Contract Reform Team produced a report in February 1994. The report set the stage for a shift to performance-based management contracting and for enhanced competition for contract continuation. Over the next few years, we will compete and/or restructure more than $40 billion worth of contracts in all. On the basis of the contract reforms already implemented at some of our facilities--such as Idaho National Engineering Laboratory--we believe significant savings as well as improved effectiveness will result from this initiative.

D. Galvin Task Force on Alternative Futures for the DOE National Laboratories

As the Strategic Plan was nearing completion, we formed the Task Force on Alternative Futures for the Department of Energy National Laboratories and tasked it with the job of conducting the first post-Cold War assessment of the National Laboratories. We intentionally constituted the Task Force with independent thinkers from industry, academia, and the public. My selection of Bob Galvin was specifically aimed at ensuring that an experienced business perspective be brought to questions involving the future of our largest laboratories. The Galvin Task Force was formed on February 2, 1992. I asked Bob to report back to the Department within one year. On February 1, 1995, he met that deadline by presenting the results of his Task Force's efforts to the Secretary of Energy Advisory Board.

E. Yergin Task Force on Strategic Energy Research and Development

In the search for a similarly-independent assessment of the Department's energy R&D programs, in October 1994 we established a Task Force of senior energy experts under the leadership of Daniel Yergin, the Pulitzer prize-winning author and President of Cambridge Research Associates, Inc. The Yergin Task Force is deep in the process of examining the Department's $1.8 billion portfolio of applied energy programs, and is committed to report by June 1, 1995. The Department is committed to saving $1.2 billion in our applied energy programs over five years, as part of the $10.4 billion in savings over five years announced by the President in December 1994.

F. Advisory Committee on External Regulation

The final initiative in this package of self-examination efforts is the Advisory Committee on External Regulation of DOE Nuclear Safety, announced on February 16, 1995. This effort is aimed at moving the Department away from the existing regime of self-regulation of its laboratories and facilities and toward regulation by external entities, including the Nuclear Regulatory Commission and Occupational Safety and Health Administration. This initiative is discussed in greater detail later in this report.

It is important to see the Galvin Task Force within the context of these other efforts--all of which have an impact on the National Laboratories. The Department has developed an initial set of responses to the Galvin Task Force, as summarized in Chapter IX), yet additional major actions must await completion of the Strategic Alignment Initiative and the Committee on External Regulation.

III. Overview of Galvin Report

Many reports have been issued over the years on the general subject of the National Laboratories. Some have focused intensely on management issues; others have focused principally on the missions of the laboratories. In very few cases, however, have any of these prior studies done as good a job as has the Galvin Task Force in providing a sophisticated treatment both of questions of management and mission. This welcome balance is important to note, because it recognizes that good management of the laboratories is simply a means to an end--and that the end, successful mission execution, depends on good management.

On the question of missions, the Task Force has clearly and forcefully validated the work of the DOE laboratories in the areas of energy, national security, environment, and fundamental science. According to the Task Force, "the laboratories' research role is part of an essential, fundamental cornerstone for continuing leadership by the United States." This statement is a compelling endorsement of the research performed within the DOE National Laboratories.

On the question of management, however, the Task Force could hardly have expressed greater alarm. They concluded that the existing system of governance--involving the Contractors, Department of Energy, Congress, and many others--is broken. The Department agrees, and has developed the following plan to fix it.

IV. Management Improvement Roadmap

Starting in December, and continuing through February, the senior management of the Department and the Directors of the DOE laboratories held several lengthy sessions aimed at creating a roadmap for improving management of the laboratories. Under Secretary Charlie Curtis provided vital leadership to these efforts. The purpose of the roadmap that has been developed will be to help the Department and the laboratories work their way out of a thicket of cumbersome, inefficient, and non value-added interactions--developed over the past several decades--which, in the view of the Galvin Task Force, jeopardize the long-term quality and effectiveness of the labs.

A. Guiding Principles for Management of the Laboratories

The starting point for this roadmap is to define both an end state, or destination, and also the rules of the road that we plan to adhere to during the journey. For this purpose, we have developed an initial set of guiding principles that capture the essence of what we hope to achieve through implementation of the specific elements of our management improvement roadmap. These principles are:

1. Create a more productive, mission-focused, and cost-effective Department and laboratory system.

2. Adopt best business practices throughout the system.

3. Require performance-based, results-oriented contractor accountability.

4. Work aggressively to achieve credible, external regulation and oversight.

5. Shift the balance of focus at the laboratories away from process compliance and toward mission success and results.

These principles are reflected in each of the elements we have identified and placed on our roadmap thus far. The roadmap elements, described below, will: 1) dramatically reform the DOE system of orders and directives, and their implementation; 2) secure better environmental, safety, and health performance at the laboratories at lower cost; 3) chart a path toward external regulation; 4) reduce the burden imposed on the laboratories by compliance-driven audits and appraisals; 5) implement an entirely new, "commercial best practices" procurement system for the contractors that manage the Department's laboratories and facilities; 6) establish within the Department a new, corporate-level governing structure for the laboratories; and 7) sharpen the focus of the laboratories on their areas of world-class expertise.

B. Reform and Reduce DOE Directives

The Galvin Task Force correctly notes that the Department's current system of directives is not working as an effective management tool. Directives are the means by which the Department establishes formal requirements and guidance for the conduct of work by employees of the Department and its contractor workforce. The current DOE directives system was created upon establishment of the Department in 1977, and was patterned after a model system developed by the General Services Administration and a working system implemented by the Department of Transportation. These directives cover the gamut of Departmental and laboratory functions, from environmental, safety and health requirements to infrastructure management to nuclear materials and classified document safeguards.

The DOE directives system was intended to help ensure that proper procedures are followed throughout the Department and its laboratories and facilities. The "drivers" behind the creation of the directives have included statutory requirements (ie. those necessary for Occupational Safety and Health Administration and National Environmental Policy Act compliance); congressional guidance emanating from the Committees of jurisdiction over the Department; internal Departmental determinations regarding necessary requirements for safeguards and security for sensitive facilities, materials, and documents; and findings by the General Accounting Office, the Defense Nuclear Facilities Safety Board, and other oversight bodies. Safety deficiencies identified by both internal and external reviews (General Accounting Office, Office of Technology Assessment, National Academy of Sciences, and others) also drove adoption of stricter standards.

During the late 1980s, as noted by several prior studies, the DOE directives system became increasingly complex and burdensome, and some would contend, dysfunctional. (The number of orders doubled from 1981 to 1992.) At the beginning of this Administration, symptoms of the problem included the following:

- There were too many directives, with duplicative requirements and conflicting implementation guidelines.

- It was not clear within the directives system whether various elements were requirements or simply guidance. Because of this uncertainty, all elements have been treated by the labs and their management and operations (M&O) contractors as requirements.

- Neither requirements nor guidance were clearly connected to improved performance.

- Excessive requirements had been developed and imposed with no disciplined assessment of the costs versus benefits of such requirements.

- There was no systematic and periodic review, reassessment, and re-validation of existing directives, and sunset provisions were not employed.

- Without any effort to establish priorities according to risk, compliance with the directives was exacting a greater and greater cost, without necessarily resulting in better performance.

Over the past 18 months, the Department has laid the groundwork for a complete overhaul of the DOE directives system--a legacy of the past which we inherited and are determined to fix. In terms of the numbers of DOE directives, we already have achieved important reductions. Since March 1994, the number of directives has been reduced by 25 percent (from 312 to 236) and we are committed to achieving a 50 percent reduction by December 1995--nine months ahead of the schedule we set for ourselves 18 months ago. Measured in terms of the number of pages involved, we have cut the universe of DOE directives from 7,200 pages to 4,400 pages (a stack of paper 4 1/2 feet tall to 3 feet) and will reduce this to 2,400 pages by mid-summer. (See Figure 2 and Figure 3).

The Department fully recognizes that numerical reductions such as this only provide part of the story. What really matters is whether these changes are reducing the burden (ie. cost, time, complexity) involved in implementation, while also facilitating excellence in performance. In this regard, the Department is committing to an aggressive schedule of actions that will result in a coherent, comprehensible, and less burdensome set of directives, which set forth unambiguous policy, provide clear distinctions between requirements and guidance, and which will eliminate unnecessary requirements.

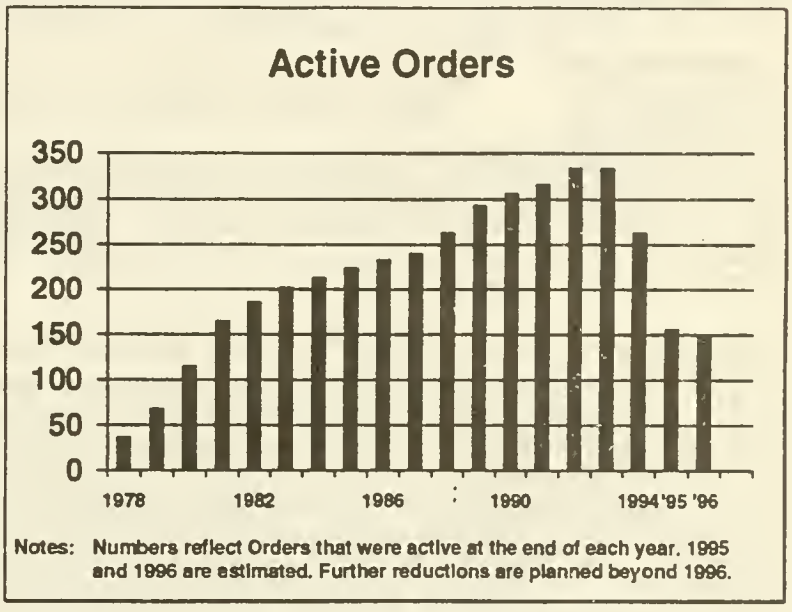

Figure 2: Reducing Number of DOE Orders

1. Concentrating on the "26 Most Burdensome" Orders

Our starting point will be to address the 26 most burdensome and inappropriately prescriptive directives that we identified through a cooperative effort with our management and operations contractors. A total of 103 orders have been identified as targets for immediate attention, which captures the 26 burdensome and all related orders. Our commitment is to eliminate or restate these orders, thereby significantly reducing their burden, between now and mid-summer.

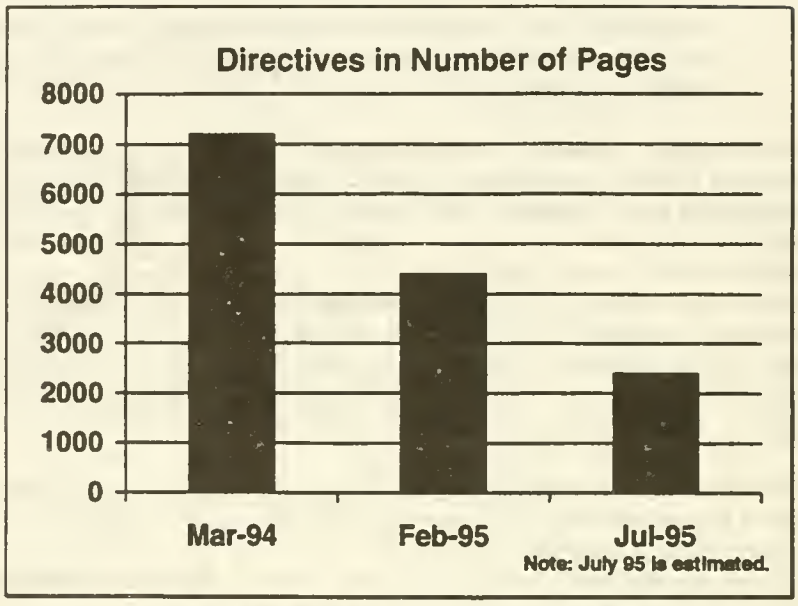

Figure 3: Directives Measured in Number of Pages

To achieve this goal, drafting teams have been established for each group of related orders. The highest priority directives among the 103 will be revised and circulated to the Department, laboratories, and contractors by April 17 (May 15 for the lower priority directives within this group). Final revisions of the highest priority directives will be issued by June 30, 1995 (July 31, 1995, for the lower priority directives). We plan to reduce these 103 orders to 42.

This is not simply an exercise in combining multiple directives. Rather, the total number of pages, the number of requirements, and the burden imposed all will be reduced. For example, 14 orders from our Office of Field Management will be reduced to one order--a reduction in the number of pages from over 1000 to under 20, and a drop in requirements from several thousand to less than 50. All of the remaining requirements will be modeled on successful private sector practices. It has been a tedious, time-consuming effort to work through the thick underbrush of these directives, thin them out, make them comprehensible, and ensure that they contribute to the desired objectives. Nonetheless, we believe that we are making significant progress in eliminating those elements of the directives that have been confusing, redundant, or unnecessary.

As the new directives are put into place, the Department will move toward a new system for implementing them and will also chart a course aimed at getting the Department out of its historic role of self-regulation.

2. Delegating Authority and Instituting Flexibility

Many elements of the Department's current directive system were driven by concerns about the highest risk elements within the Department (e.g. plutonium handling, weapons production, nuclear reactors), yet the Department supports an extremely wide scope of facilities--many of which are no different than exist in industry or academia. To move away from a "one size fits all" application of directives, in which a research accelerator is forced to address the same requirements as a weapons dismantlement plant, the Department will institute a "necessary and sufficient" process. Rather than starting with the universe of directives and determining whether a facility is complying with each and every element, an entirely different approach will be adopted.

We will begin by assessing the work to be performed, analyzing the hazards involved, and then determining the procedures that are "necessary and sufficient" to address those hazards. We will develop standards through an objective technical assessment of hazards. Once the standards are confirmed, the "necessary and sufficient" determination will be delegated to the lowest management level--as close to the work as possible--where work and resource management can be integrated.

Pilot programs at diverse facilities will be established from now through September to demonstrate the validity of the process for determining necessary and sufficient sets of standards. The results of these pilot efforts will be examined, then our expectation is to proceed with widespread implementation.

3. Charting a Path Toward External Regulation

There is a growing sentiment within the Department, at DOE laboratories and facilities, and by external observers--including the Galvin Task Force--that the Department should excise itself from its historic role of self-regulation. The Department's existing complex system of self-regulation emerged from the Manhattan Project, Atomic Energy Commission, and Congress in response to the urgency of the nuclear weapons mission and the need for secrecy at the weapons production complex and affiliated laboratories. The policy judgment of the Congress, expressed through the Atomic Energy Act, was to rely on a system of self-regulation by the Atomic Energy Commission, and its successor agencies, rather than to impose risks on the system from external regulation. However, with the end of the Cold War and general shut-down of the nation's weapons production complex, maintenance by the Department of a separate apparatus for self-regulation appears to many as being unnecessary. It will not be a simple matter, however, to achieve the transition to external regulation. In part

because the Department's facilities are among some of the most hazardous in the world, involving large volumes of extremely toxic and volatile materials which demand constant attention.

Many environmental matters at the Department's laboratories and facilities currently fall within the regulatory framework of the Environmental Protection Agency, but other environmental, occupational, safety, and health matters, and nuclear safety, are "regulated" by the Department, as provided for under the Atomic Energy Act. Demonstrating our commitment to external regulation, the Department announced on February 16, 1995, the formation of an Advisory Committee on External Regulation of Department of Energy Nuclear Safety. Headed by John Ahearne, former Chairman of the Nuclear Regulatory Commission, and Gerard Scannell, former Assistant Secretary for Occupational Safety and Health, this Committee has been tasked to provide recommendations to the Department regarding external regulation in an interim report within six months and a final report by the end of the year.

Serious and complicated issues will be addressed during this review, since the potential external regulatory bodies may not currently be equipped to address many of the unique facilities operated by the Department. As appropriate, we intend to establish pilot projects as soon as possible to help facilitate and inform the transition to external regulation.

C. Consolidate and Simplify DOE Audits and Appraisals

The DOE laboratories have been the victims of an investigative mentality pervasive within the entire body of organizations (e.g. Departmental, congressional, and external oversight groups) which have clear or perceived jurisdiction over the laboratories. This mentality grew out of discoveries of serious deficiencies in environmental, safety, and health management across DOE facilities. However, of late, too little effort has been made by oversight groups to coordinate their reviews, respect each other's findings, and assess the cost/benefit impact of their examinations of the laboratories. As noted in the Galvin Report, some of the Department's laboratories have experienced several hundred audits and appraisals per year.

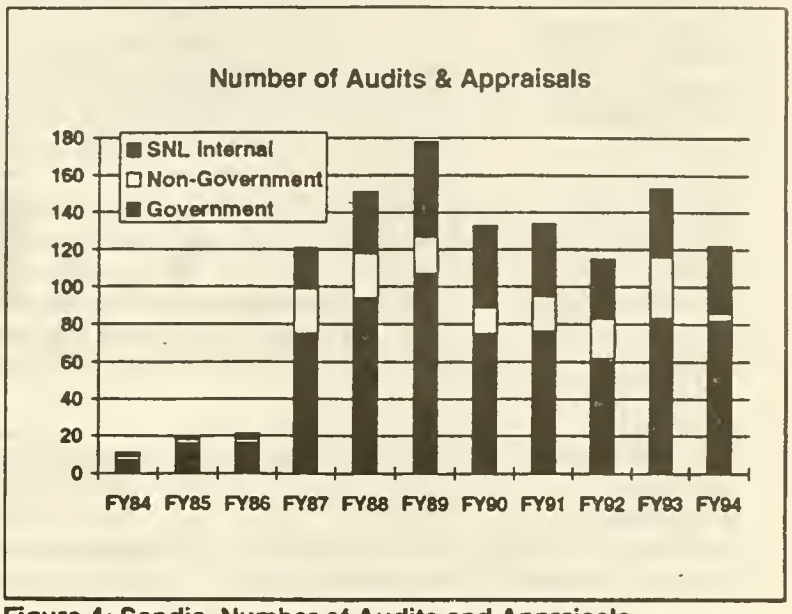

Figure 4: Sandia, Number of Audits and Appraisals

Figure 4 depicts a fairly representative story, in which Sandia National Laboratories has experienced a ten-fold increase in audits and appraisals over the past ten years, and more than a ten-fold increase in the growth of "person-days" involved--which captures only the time of auditors and appraisers, and not the corresponding time required of the Sandia employees who were involved (See Figure 5).

The current situation is exacting a price on performance and efficiency that is totally incommensurate with any perceivable benefits (e.g. enhanced performance, lower risks, increased safety) from this intense and inefficient level of oversight. Some have viewed the current situation as an "audit everything in sight" approach to managing the laboratories. As a result, each year the laboratories experience literally hundreds of redundant, uncoordinated, and unnecessary reviews, audits, and appraisals. Although many of these involve external bodies, over which we have no control, we know that the ones which the Department does own can be done in a much better way. And we will do it better:

The Department will immediately adopt a plan to reduce the impact on the laboratories of the audits and appraisals within its control. Specifically, we are committing to a Pilot Performance-Based Oversight Process for all of the Department's laboratories. To the maximum extent possible, oversight will be conducted on a performance basis--with requirements and oversight criteria clearly understood up front. And we will simplify and consolidate our appraisals wherever it makes sense to do so. Some prescriptive approaches are necessary, however, to comply with statutes.

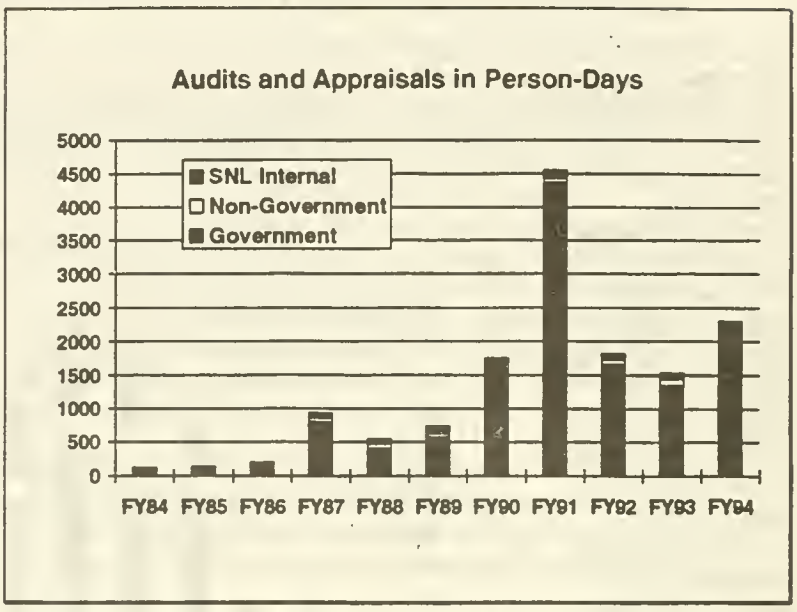

Figure 5: Sandia, Audits and Appraisals as Measured by Person-Days

- Effective immediately, we will impose a moratorium on DOE reviews at the laboratories in regard to all aspects of the business practices of these facilities (e.g. procurement, information systems, project management, personal property, facilities management). Within 30 days, a team championed by our Associate Deputy Secretary for Field Management will define the scope and implementation of an entirely new approach to business practice reviews. Rather than repeatedly going into the laboratory throughout the year with audits and appraisals in these areas, the Department will consolidate all of these reviews into a single integrated business management assessment to be conducted at each laboratory once a year. The guiding purpose of these audits and appraisals will be to add value to the laboratories by helping to strengthen their systems for internal resource management and control. In areas where excellence is identified, it will be rewarded by reduction in the frequency or need for oversight.

- A similar pilot project will be done for the internal environmental, safety, and health reviews run by the program offices of the Department. (As distinct from

the independent reviews conducted by the Office of the Assistant Secretary for Environment, Safety and Health.) This effort will be championed by the Office of Defense Programs, with a plan to be in place within 90 days.

- In addition, within 180 days, a team led by the Director of our Office for Energy Research will define the scope and implementation plan for simplified technical reviews conducted by our program offices.

The result of these efforts will be substantial. For example, an early estimate of the impact on Lawrence Berkeley Laboratory suggests that one annual multidisciplinary business practices appraisal will replace over a dozen separate appraisals that would have been conducted over the next year.

With all of these reforms, we will establish specific expectations and measures of performance to track our success in reducing oversight burdens, cutting costs, and enhancing performance.

D. Revolutionize the Procurement Practices for DOE Contractors

Another element of our Management Improvement Roadmap for the Laboratories involves a complete revision of our framework for evaluating the procurement activities of our management and operations (M&O) contractors. The objective will be to move away from an inefficient and bureaucratic model--which focuses heavily on process for its own sake--and toward widespread adoption of best commercial practices.

Unlike other contractors, the Department's M&O contractors have been expected to adhere to what is called the "federal norm" in procurement practices. The "federal norm" has been an extremely imprecise and evolving standard. Although the M&O's are not required to adhere to Federal Acquisition Regulations, per se, they have been expected to adhere to federal practices. Where there has been doubt, the M&O's have been forced to retreat to adopting procurement practices mirroring those of the federal government. As a result, contractor purchasing has, over the years, become increasingly Federal-like and less like efficient and effective commercial business practices.

Our sense is that we should be promoting the best in commercial practice by our M&O contractors, with the resulting efficiencies and cost reductions, and not expecting contractors to conform to a cumbersome Federal model. One of the primary reasons why we adopted a government-owned, contractor-operated (GOCO) concept in the first place was to take advantage of the more efficient and flexible business and management systems that M&O contractors would bring to the job of managing the laboratories. The "federal norm" approach to M&O contracting deprives the

government from benefiting from the business acumen and experiences of our M&O contractors.

We believe the system needs to be fundamentally changed. To achieve this goal, the Department on February 28, 1995, sent to the Federal Register a Notice of Proposed Rulemaking to modify requirements for the M&O contractors purchasing systems, such that we will eliminate the application of the "federal norm" and replace it with a system that expects the use of best commercial practices. There will be a 60-day public comment period, and we would hope to issue a final rule this summer. The Department has identified certain purchasing system objectives and standards which it believes are common to world-class industrial purchasing activities, and will be assessing our M&O contractors' performance against those goals and standards. As a result, there will be more self-assessment, value-added analysis, benchmarking, and earned autonomy. This approach is consistent with reforms underway in the entire Federal procurement system, and with the Government Performance Results Act.

V. Governance of the National Laboratories

The most provocative recommendation within the Galvin Task Force report is to "corporatize" the laboratories through the creation of a not-for-profit Board of Trustees, appointed by the President, that would receive multiyear block-funding from Congress. The principle rationale for such a radical change in governance is that such an approach might better insulate the laboratories from micromanagement and excessive oversight by the federal government.

The Department is continuing to examine the specific governance model in the Galvin Report, as well as other models ranging from maintaining the status quo through privatization of the laboratories. While we appreciate the novel thinking expressed in the Galvin Report, we are not persuaded that the specific model envisioned would be either practical in the near-term or sustainable over the long-term. Such a dramatic change in governance would require a level of national consensus on the merits of such a proposal which we do not believe currently exists, or is likely in the foreseeable future. We reach this view based on but a sampling of public comments and congressional reactions to the Galvin governance model. Numerous observers have suggested that it is unrealistic to believe that Congress would relinquish its authorities over such a large amount of federal R&D funding. Others have criticized the approach as failing to provide levels of accountability that normally are expected of public funds.

The Department shares many of the precautions listed on page 9 of the Task Force report, including concern that such an approach could force these institutions away from long-term research and into a "job shop" mentality. Additionally, as the report indicates, there are risks that an effort to introduce a new system of governance could be used "as a political pretext to dismantle or destroy a system of laboratories which has served the nation well in the past, is continuing to perform important public functions, and holds the prospect for delivering new scientific insights and technological innovations which will justify its continued value to the Nation."

The Department's view is that we must be extremely careful not to destroy the National Laboratory system in the name of trying to fix it. Given the uncertainties and risks involved, the Department's strategy will be to pursue a two-track approach to the question of governance of the National Laboratories. On one track, we will continue to explore options for fundamental changes in the framework for governance of the laboratories. Perhaps a model approaching what is discussed in the Galvin Report might emerge and satisfy its critics. However, on a separate track we will move aggressively to improve the current system--thus striving to reach the same goals as envisioned for the Galvin model. This second track will involve aggressive implementation of our Management Improvement Roadmap (which will address the issues in Appendix B of the Task Force report), combined with establishment of a new, corporate-level governing board within the Department, and including external

advisors, to provide high-level decision-making regarding the current and future operations and missions of the National Laboratories.

VI. Create a Lab Operating Board within DOE

In a collective effort during the past month, senior management of the Department and the DOE Laboratory Directors have developed a management improvement concept--the creation of a DOE Laboratory Operating Board--which we believe will address numerous governance issues identified in the Galvin Report. As such, our intention is to move expeditiously to constitute such a board.

One way of viewing the role of this new Lab Operating Board is to look at the structure of large private sector companies which involve a conglomeration of business lines, such as found at the National Laboratories. Dr. Alexander MacLachlan, former Senior Vice President and Chief Technical Officer for Dupont and currently the Department's Deputy Under Secretary for Technology Partnerships, has helped illustrate the important parallels between the Department of Energy and companies like Dupont (See Figures 6 and 7). In so doing, he makes it clear that many of the types of issues that have received insufficient management attention by the Department are addressed within Dupont by a Corporate Technology Council. The Department currently has no such forum.

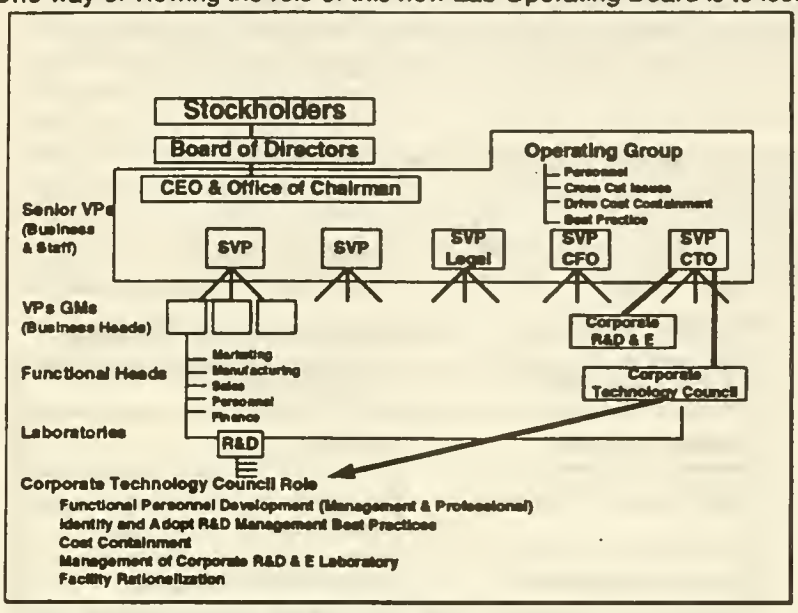

Figure 6: Structure of a Corporation

By March 31, 1995, the Department will formally charter a Laboratory Operating Board, to be chaired by the Under Secretary of Energy. Membership will consist of the senior management officials within the Department that utilize and impact the cost of doing business at the National Laboratories, as well as a subgroup of private sector advisors, who will be constituted as a standing panel of the Secretary of Energy Advisory Board. Members of the external advisory panel would be appointed to six year, overlapping

terms in order to provide continuity and institutional memory through changes of Administration. This new Board would be expected to meet quarterly, and would have jurisdiction over issues such as:

- High-level strategic direction for the laboratories, including validation of strategic plans, cross-cutting programmatic and management issues, and facility rationalization;

- Managing development and implementation of a Strategic Laboratory Mission Plan, which will include a mission statement for the entire Laboratory system and more tightly focused missions for each of the laboratories; this Plan will serve as the framework for down-sizing and "rightsizing" efforts that would tailor laboratories to the size of their purpose;

- Monitoring, expanding upon, and ensuring implementation of the Management Improvement Roadmap described in this testimony;

- Cost-containment, including ensuring application of best business practices, addressing cost-benefit issues related to administrative and regulatory requirements;

- Analysis and determination of Centers of Excellence and lead laboratory designations.

Through these authorities, the Lab Operating Board will play a major role in the issues of mission allocation and laboratory sizing raised by the Galvin Task Force. The Department will develop issue-specific subcommittees of this Board that would include senior career civil servants to help maintain continuity, and will constitute one Standing Subcommittee for the Laboratory Directors.

"Corporatizing" the Department of Energy

XYZ Corporation	Taxpayers
Board of Directors	Congress
CEO & Office of Chairman	Secretary, Deputy, Under Secretary Chief Financial Officer, etc.
Senior Vice Presidents	Senior Political Officials
Vice President /General Managers	Civil Servant Deputies
Business Division R&D Labs	National Labs
Corporate Technology Council	"Missing Link" (DOE Lab Operating Board)

Figure 7: "Corporatizing" the Department of Energy

VII. The Management Roadmap: Helping Achieve the Lab Missions

The Management Improvement Roadmap which we propose in this report is not an end in itself; it is simply a means to an end. The end that we are seeking to achieve is more effective and efficient mission activities of the Department and its laboratories and facilities. The Galvin Task Force correctly diagnosed the National Laboratories as a system under extreme stress--part of which has been caused by the burden of conflicting, contradictory, non value-added, and increasingly intrusive oversight and management of the laboratories. These burdens have increased the cost of doing business at the laboratories and impacted mission performance to a degree that is far in excess of the potential benefits. Management intervention by the multitude of parties who have an interest in prescribing how the laboratories should conduct their business should be radically simplified, rationalized, and--where appropriate--curtailed. The replacement framework should presume a level of trust, and should encourage accountability, self-assessment, and excellence. This will enable enhanced focus on what really matters, which is the utilization of these national assets to help meet the energy, national security, environmental, economic, and scientific needs of the nation.

VIII. Mission Recommendations of the Galvin Task Force

The Galvin report serves as a strong validation of the core missions of the Department and the National Laboratories. The past performance of the National Laboratories and their significant potential for important future contributions are given notable attention. As noted below, however, the Galvin Report did not provide detailed R&D agendas within the Department's core mission areas. Such plans have been developed for the Department's national security activities, eased in part by the clarity of the customer-requirement equation which governs our stockpile stewardship and stockpile maintenance programs. Detailed strategic plans are not as well defined for the Department's energy, environmental, and science programs--but will be developed by the Department and reviewed by the Lab Operating Board over the next nine months.

1. Energy Research and Development

The Galvin Report provides a strong statement about the necessity of continued Federal support for energy R&D. They describe the important public purpose of long-term energy R&D, they conclude that "energy" is an important unifying focus for work at the National Laboratories, and recommend that Department do more to manage its energy R&D as a portfolio and to better integrate this work both internally, with fundamental science activities, and externally, with industry and academia. We agree with these views. Although the Galvin Report says that there exists "a long list of exciting, challenging, and vital areas of research and technology development that constitute the appropriate energy agenda for the laboratories," the report does not lay out in any detail the elements of that agenda. The Department did not expect it to do so, which is why we established a separate exercise--the Yergin Task Force on Strategic Energy R&D--to provide a detailed assessment of our energy R&D programs. The Yergin Task Force report, due in June 1995, will serve as a vital input for the development of a cross-cutting strategic plan for the Department's energy programs.

2. National Security

The Department is pleased by the Galvin Task Force's support of our science-based stockpile stewardship program, including support for the National Ignition Facility. The Task Force correctly observed that the focus of the Department's national security programs has changed dramatically as a result of the end of the Cold War, cessation of nuclear testing, consolidation of most of our nuclear weapons production complex, and new threats posed by the proliferation of weapons of mass destruction.

The Department agrees with the Task Force that one of the most important priorities for our stockpile stewardship mission is to attract and retain skilled scientists, engineers, and managers over the years ahead with the expertise required for the complex and

demanding stewardship role. We also agree that the starting point for assessing the future size, budget levels, mission focus, and configuration of the Department's three weapons laboratories must be the national security requirements established by the President. The Department will closely evaluate the Task Force's recommendations regarding a reduction of some of the nuclear weapons functions at Lawrence Livermore and their transfer to Los Alamos. We have an initial favorable disposition for a careful phase-down of some of Livermore's nuclear weapons work, combined with a re-emphasis on non-proliferation, counter-proliferation, and verification activities. However, our actions proceeding down this path -- the timing and the details -- must depend on assessments of how best to meet our continuing national defense requirements in a wholly new era.

3. Environmental Science and Technology

The Task Force describes the diversified environmental mission at the laboratories as including two traditional areas of activity and one emerging area. The traditional areas are science and technology development associated with the clean-up of nuclear waste, and R&D related to reducing the environmental impacts of energy use (e.g. global climate modeling, atmospheric chemistry). The emerging area involves systemic approaches to reducing energy and materials consumption both in specific industrial applications -- such as through environmentally-conscious manufacturing -- as well as for entire segments of the economy.

Our attention focuses first on the traditional area of activity involving clean-up technologies and the Department's weapons site clean-up program. The Task Force includes a critical assessment of the Department's Environmental Management program. The Department does not believe that sufficient effort was made by the Task Force to develop a full understanding of the strides we have made in directly addressing problems we inherited from the past. Over the past two years, we have worked to assess and to quantify the vulnerabilities at each site and have established both a national advisory board--which includes world-class scientists--and a host of site-specific advisory boards. We have taken--and are continuing to take--bold actions to cut costs, reinvent the program, and accelerate clean-up activities. We already have successfully implemented several of the Task Force's recommendations in this area, of which the Task Force apparently was unaware.

The Department agrees that the science and technology base must be greatly expanded for this program. We also agree that there exist important opportunities to secure additional contributions from the DOE laboratories in this realm, particularly in the development of systems approaches to the stabilization and clean-up of some of our most hazardous wastes. Toward this end, we recently announced that the Idaho National Engineering Laboratory would be the Department's lead laboratory for mixed-waste cleanup efforts. The Pacific Northwest Laboratory has been given lead responsibility for developing technology needed to quickly, safely, and cheaply dispose

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of millions of gallons of radioactive wastes stored in underground tanks. Additionally, the Savannah River Technology Center, a program-dedicated DOE laboratory, has been named lead lab in landfills research. Also, Los Alamos Laboratory has been selected to serve as Lead Lab for research on technology gaps in stabilizing and packaging plutonium for interim safe storage and long-term storage leading to permanent disposal. These designations were made based on recognition of the expertise of these facilities in handling these challenging R&D issues.

The Task Force recommends that as much as $400 million annually, and eventually twice that much, should be provided to the laboratories to help develop the necessary clean-up technologies. (In FY 1995, the DOE laboratories will receive approximately $150 million (45%) of the Environmental Management program's $337 million technology development effort.) The Department will continue to examine the Task Force recommendation closely as we refine our strategies for accelerating the science and technology base for this program. However, we are not prepared to direct an arbitrary amount of increased funding to the National Laboratories in this area. Cost and performance of the labs vis-à-vis industry and academia must drive our decisions regarding the relative roles of these different R&D performers in the development of clean-up technologies.

Regarding the other environmental missions addressed in the report, we are in strong concurrence. We need to achieve greater integration and coordination between our energy and our environmental research programs. The Task Force states that the National Laboratories "should play a significant role--in collaboration with energy- and materials-intensive industries--in the development of environmental technologies and an enhanced understanding of resource utilization in the economy." The Task Force notes that the specific core capabilities of the National Laboratories in areas such as energy technologies, advanced manufacturing, materials science and technology, and modeling and simulation, provide the basis for a considerably enhanced contribution to emerging fields such as "industrial ecology." No specific research agenda is addressed, yet the Task Force commends the Department's existing work to define R&D agendas with several energy- and materials-intensive industries. More work will need to be done to develop a more refined agenda that might guide the laboratories activities in this area.

4. Fundamental Science

The Task Force provides an especially strong endorsement of our fundamental science mission, stating that the Department "should sustain and strengthen its support of fundamental science." The Task Force supports this work for as "being essential to the fulfillment of our need to know," and also for their direct support of the Department's missions. As the Task Force states it:

"The national laboratories have a major mission to serve in contributing to the scientific foundation which underpins the Department's other mission areas."

This strong support acknowledges that the National Laboratories house powerful scientific instruments (e.g. accelerators, materials research facilities, supercomputer centers) that enable academic, industrial, and federal researchers to explore new scientific frontiers that could not be reached in any other fashion. These scientific facilities at the DOE Laboratories currently are used by more than 15,000 scientists representing 278 U.S. colleges and universities, 265 U.S. companies and 47 U.S. laboratories. Scientists from 48 states conduct research at the National Laboratories, performing work that they could not do elsewhere. The President's FY 1996 budget proposal of $100 million for enhanced utilization of DOE science facilities strongly supports this recommendation of the Galvin Report.

5. Industrial Technologies and Technology Transfer

The Task Force concludes that technology transfer/industrial competitiveness activities of the National Laboratories should be focused on industries and areas of technology that contribute directly to the Department's primary missions in national security, energy, and environment. The Department agrees. Indeed, our view is that successful execution of our core missions increasingly depends upon involvement of the private sector through technology partnerships. Through such collaborations, the Department is achieving a vital leveraging of private sector resources toward meeting the public missions of the Department.

The Task Force expresses concern that industrial collaborations not be perceived as a primary mission activity. This is consistent with the Department's view, which has also been that collaborations with industry be viewed as a derivative mission and critical success indicator of our other missions. Through its partnerships with industry, the Department helps to maximize the value of the public investment in these institutions by increasing the prospects of getting taxpayer-financed innovations to the marketplace, while also meeting DOE mission needs.

It is interesting to note that the Galvin Report does not contain any criticism about the culture of either the laboratories or the Department not being prepared for partnerships with industry. In contrast, a series of reports written over the previous decade primarily criticized the Department's laboratories for being too isolated from the rest of the nation's R&D enterprise. Those studies criticized the Department and the National Laboratories for not contributing enough to economic competitiveness, for having a culture that was incompatible with industry, and for being too slow in approving cooperative research and development agreements (CRADAs).

The Department made a major effort to address these concerns and has made great progress. We have streamlined our processes and cut in half the time it takes to enter into CRADAs. The number of CRADAs has grown to over 1200, which involve commitments from our industrial partners of more than $1 billion.

The changes that the Department has made in support of Administration policy did not come easily or automatically, and can be attributed in part to the emphasis that was placed on industrial partnerships being a high priority for the Department. The Galvin Task Force suggests that the Department has now overemphasized industrial competitiveness. We believe that if we had not emphasized it as strongly, the Department would not have moved nearly as rapidly toward becoming a good partner. Moreover, our view is that the new concerns that the Task Force has raised are much less fundamental -- and far easier to address -- than was the earlier concern that our culture was simply incompatible with that of industry.

The Department has developed and will immediately issue a criteria-based framework that will help ensure strategic focus and mission-connection to our partnerships. More specifically, these criteria will ensure that our partnerships will:

- Provide mission benefits as well as benefits to our partners;
- Provide fair opportunities for companies;
- Employ good business practices; and
- Produce results that we can measure and evaluate.

IX. Commitments and Timelines

The remainder of this report provides a specific timetable for the commitments in our Management Improvement Roadmap, as well as detailed responses by the Department to each of the 29 recommendations summarized in Chapter VIII of the Galvin Report. As noted earlier, however, these specific commitments do not represent the full set of actions which the Department intends to take in response to the Galvin Report. Other actions await the Strategic Alignment. Additionally, the Department is still examining public comments that were submitted in response to the Galvin Report. These comments are rich with insight which will inform our efforts to improve the National Laboratory system. Finally, the actions of the DOE Laboratory Operating Board will serve as a continuing forum addressing critical issues that affect the cost of doing business at the National Laboratories and the effectiveness of these institutions in meeting national needs.

As we implement the actions of the Management Improvement Roadmap discussed in this report, we will be able to take costs out of the laboratories. This will help them reach new levels of performance and productivity in addressing vital national needs. How much savings we will be able to achieve is difficult to predict. However, they should be significant. With a streamlined apparatus for managing the laboratories within the Department, the Laboratories will be required to restructure themselves into more efficient operations.

The National Laboratories have a long record of achievement and excellence. Programs conducted at these laboratories have consistently challenged our basic understanding of the world around us and driven new fields of scientific inquiry, discovery, and technological development. These labs hold the potential to make considerable future contributions to the nation's security, environmental quality, knowledge base, prosperity, and quality of life. The Department is eager to work with the National Science and Technology Council to create the management and programmatic framework that will guide these laboratories into the next century.

X. Management Improvement Roadmap Implementation Schedule

Roadmap Element	Implementation Timeline
1. Rules of the Road	Immediate Implementation
2. Reform and Reduce Directives a. 50% reduction in # of orders b. 26 most burdensome reissued c. Necessary & Sufficient process	 Complete by 12/31/95 Complete by 7/31/95 Field Pilots 3/95-9/95 Implementation fall 1995
3. Committee on External Regulation	Interim report 8/95; final report 12/95 Pilot projects during 1995
4. Reform Audits/Appraisals	Immediate moratorium on business practice reviews; implementation within 60 days for integrated business practice review; 90 days for simplified line program ES&H reviews; 180 days for simplified program reviews
5. Procurement Reform	Notice of Rulemaking to eliminate "federal norm" sent to Federal Register 2/28/95; 60-day public comment; final rule summer 1995
6. DOE Lab Operating Board	Charter finalized by 3/31/95; Standing Panel of Secretary of Energy Advisory Board established by 4/15/95; first meeting tentatively May 1995.
7. Enhanced Mission Focus for labs; Development of Strategic Lab Mission Plan as framework for strategic direction and lab sizing.	As major agenda item of DOE Lab Operating Board, this will be addressed during first meeting of the Board. Strategic Laboratory Mission Plan, due 9/95, will include framework for Centers of Excellence and Lead Labs within context of mission plans.

XI. Galvin Report Recommendations: DOE Position, Commitments, and Deadlines

National Security		
Recommendation	**DOE Position**	**Action**
1. *The primary mission of the weapons laboratories must be safe, secure and reliable nuclear stockpile in the absence of explosive testing. Science-based stockpile stewardship requires the following rank-order priorities:* *- Attracting and retaining skilled scientists,* *- Enhancing surveillance of weapons* *- Continuing hydrodynamic testing* *- Assessing problems, reanalyzing previous data* *- Sustaining the scientific process*	Support	**Commitment:** We will continue to evolve the science-based stockpile stewardship program, which the Task Force endorses, as the principle framework for the nuclear weapons-related mission of the weapons laboratories. During further refinement of missions for the DOE labs, the absence of nuclear testing will remain centrally important. Investments by the Department in world-class scientific programs such as the National Ignition Facility and the Los Alamos Neutron Scattering Facility (LANSCE) will help meet the high priority objective of attracting and retaining top level scientists and engineers. The Department's stockpile management program will provide enhanced surveillance. **Deadline**: 1) A document describing our overall Stockpile Stewardship & Management Strategy will be available by April 1, 1995; 2 A KD-1 Prime decision (Non-proliferation evaluation) on the NIF will be made July/August 1995; 3) The Phase I upgrade program to the LANSCE will be completed by July 1995; and 4) The Department plans to complete the Environmental Impact Statement on the Dual Axis Radiographic Hydro Test facility (DARHT) which will provide an advanced hydrodynamic testing capability by September 1995.
2. *Non-proliferation, counter-proliferation, verification, and intelligence support have become a major mission along with stewardship of the nuclear stockpile. Organizational compartmentalization within the Department complicates and makes difficult the appropriate inter-relationship and funding balance the Department's organization reflect their importance and interdependence.funding balance the Department's organization reflect their importance and interdependence.*	TBD	**Commitment:** Recommendation suggests that Office of Defense Programs and Office of Nonproliferation and National Security either be merged or that programmatic activities receive greater integration. These options are being examined in the Strategic Alignment. **Deadline:** Recommendation due May 4, 1995, which is when final Strategic Alignment report is due.

National Security		
Recommendation	**DOE Position**	**Action**
3. *Lawrence Livermore Laboratory should retain enough nuclear weapons design competence and technology base to continue its activities in non-proliferation, counter-proliferation, verification, and intelligence support, to provide independent review for several years while alternative approaches to peer review are developed, and to participate in weapons relevant experiments on the National Ignition Facility (NIF). Lawrence Livermore National Laboratory would transfer as cost-efficiency allows over the next five years its activities in nuclear materials development and production to the other design laboratory. Lawrence Livermore National Laboratory would transfer direct stockpile support to the other weapons laboratories as the requirements of science-based stockpile stewardship, support of the DoD nuclear posture, and the status of the test bans allow.*	Support, with qualifications	**Commitment**: The Department supports the study of a careful phase-down of some of Lawrence Livermore's nuclear weapons work, combined with a reemphasis on non-proliferation, counter-proliferation, and verification activities. Timing and details of phase-down will depend on assessment of how best to meet continuing national defense requirements in absence of testing. Alternative methods of retaining peer review will be examined to provide basis for any decisions. **Deadline**: Provide strategy for response to this recommendation by April 15, 1995.
4. *Continued funding support for the Dual-Axis Radiographic Hydrodynamic Testing (DARHT) facility; continued near-term support for the Los Alamos Neutron Scattering Experiment/Los Alamos Meson Physics Facility (LANSCE/LAMPF); continued pursuit of advanced computing, including computing through workstation networks; and proceeding with the National Ignition Facility (NIF) as a research facility, balanced with respect to other major investments.*	Support	**Commitment**: The Department will provide continued support for each of these elements of the science-based stockpile stewardship program. President's FY 1996 budget includes $32 million for DARHT, $25 million for LANSCE, $45 million for advanced strategic computing, and $61 million for design activities associated with the National Ignition Facility. **Deadline**: 1) A KD-1 Prime decision (Non-proliferation evaluation) on the NIF will be made July/August 1995; 2) Formal scoping process for the Stockpile Stewardship/Stockpile Management PEIS schedule to begin July 1995; 3) The Phase I upgrade program to the LANSCE will be completed by July 1995.

National Security		
Recommendation	**DOE Position**	**Action**
5. *Future production needs should be based on residual capabilities of Pantex, Los Alamos National Laboratory, and Sandia National Laboratories, and believes that no further investments in production capability are needed at this time.*	Oppose	**Commitment**: The Department is committed to ensuring the safety, security, and reliability of the existing U.S. stockpile well into the future, which will require a smaller, more cost-effective production complex to replace the stockpile when needed, including limited life components and a new tritium source. The President's FY 1996 budget includes $50 million to support a new tritium source. Existing production capabilities will be downsized, but production capabilities within the weapons laboratories may be required. **Deadline**: The Stockpile Stewardship & Stockpile Management Program Plan which will analyze program and site alternatives for nuclear weapons production requirements between today and the year 2010 will be released October 31, 1995; followed by a draft PEIS and February/March 1996, and a final PEIS in July/August 1996. DOE released a draft PEIS on Tritium Recycle and Supply on March 1, 1995. Public hearings on the draft PEIS begin March 14 and conclude April 20. Final PEIS due October 1995. Record of Decision November 1995.

Energy And Environment		
Recommendation	**DOE Position**	**Action**
1. *The Department should organize itself to achieve greater integration among its applied energy programs, between these programs and industry, and between the applied energy and basic energy research work performed at the laboratories.*	Support	**Commitment:** The Department established in October 1994 the Task Force on Strategic Energy R&D, chaired by Daniel Yergin, in part to develop a plan that would assist in meeting the goals established by this recommendation. **Deadline:** Yergin Task Force report will be finalized in June 1995; the Department will work to implement its recommendations--particularly any that relate to enhanced integration of DOE energy R&D programs internally and with academia and industry--during summer 1995.
2. *The integration of energy and environmental considerations should be a fundamental organizing principle for much of the Department's activities.*	Support	**Commitment:** The Department is committed to sustaining and building on its partnerships with major energy- and materials-intensive industries, and to use these partnerships as an expanded framework for meeting the Task Force recommendation. Specifically, the Department has developed or is working on technology roadmaps for the forest products, refining, steel, glass, chemical, metal casting, and aluminum industries--which collectively account for more than 80 percent of the nation's manufacturing energy use and together generate approximately 90 percent of U.S. manufacturing waste. **Deadline:** Within three months, a plan will be developed cooperatively by the Office of Energy Efficiency, Office of Fossil Energy, and Office of Energy Research that examines options for using the existing framework of partnerships with energy- and materials-intensive industries as a basis for broader integration of energy and environmental considerations within the Department at the laboratories. The plan will be presented to the Lab Operating Board. In addition, by May 4, 1995, the Strategic Alignment will provide recommendations for achieving greater integration of energy and environmental activities within the Department.

Lab Missions and Organization		
Recommendation	**DOE Position**	**Action**
1. *The Department and the national laboratories should move promptly to establish clear mission statements for the laboratories which will be utilized as tools for budget decisions and long-term strategic planning.*	Support	**Commitment:** The Department, working with the Laboratories, will develop more tightly focussed mission allocations for the DOE Laboratories with the goal of building on areas of excellence, enhancing clarity of focus for each lab, and identifying areas for downsizing. The Laboratory Operating Board, which the Department will create in April 1995, will provide the framework for developing refined mission allocations to the labs **Deadline:** Interim Strategic Laboratory Mission Plan complete by July 1995, for consideration in context of FY1997 budget development; final Plan due December 1995.
2. *Mechanisms should be established to enhance the management of the multi-program laboratories as a system.*	Support	**Commitment:** Considerable progress has been made during past year in getting the National Laboratories to work together as a system. An immediate project of the DOE Laboratory Operating Board will be to work with the laboratories to identify and implement means of further integrating National Labs into a system. **Deadline:** Plan to be presented at first meeting of DOE Lab Operating Board, scheduled for week of April 24.
3. *The Department should establish lead laboratories according to mission assignments and programmatic strengths.*	Support	**Commitment:** Lead laboratory designations will be made, as appropriate, within the context of the Strategic Laboratory Mission Plan. **Deadline:** Framework for Lead Laboratories will be included in the Interim Strategic Laboratory Mission Plan, due in July 1995.
4. *The Department should establish Centers of Excellence within the laboratory system.*	Support	**Commitment:** Centers of Excellence will be established, as appropriate, in support of Lead Lab designations and the Strategic Laboratory Mission Plan. **Deadline:** Framework for Centers of Excellence will be included in the Strategic Laboratory Mission Plan, due in interim form in July 1995.

Weapons Site Clean-Up		
Recommendation	**DOE Position**	**Action**
1. *Improvements in DOE management are needed.*	Task Force Failed to learn current program status	**Commitment:** The Task Force seems to be unaware of the substantial progress the Department has already made in improving the management capabilities in the environmental management program at all levels. The Task Force had minimal direct interaction with the program, and appears to have relied too heavily on outdated reports. The Department has significantly increased management capability by hiring and training competent project managers, cost estimators and contract coordinators. This new management capability has already resulted in a savings of more than $500 million in the Environmental Management program. Also, the Quality Improvement Team concept (QIT) has afforded the Department continuous improvement in its managerial enterprises. **Deadline**: Continuous improvement in management capabilities will be an ongoing priority for the Environmental Management program.
2. *The EM program requires a substantial commitment and high priority addressing the challenges of this program.*	Support/ completed	**Commitment**: It is unclear why the Task Force suggests that the Department has not made a "substantial commitment" or made environmental management a "high priority." With an annual budget of more than $6 billion, Environmental Management is the largest environmental program in the world, and, as of FY 1994, it is the largest program in the Department of Energy. The level of commitment and priority necessary for this program will be maintained. **Deadline**: NA

Weapons Site Clean-Up		
Recommendation	**DOE Position**	**Action**
3. *Establish an Environmental Advisory Board EAB reporting to the Under Secretary.*	Completed	**Commitment**: The Department already has established several advisory boards and independent reviews to service the Environmental Management program. Our challenge is not to create more advisory boards, but to use the ones that exist more effectively. We commit to continued utilization of: (1) an existing Environmental Management Advisory Board (EMAB), (2) two ongoing studies by panels of the National Academy of Sciences, (3) the Development of On-site Innovative Technologies (DOIT) Committees, and (4) Site Specific Advisory Boards that exist at every major cleanup site. The EMAB, of which the Task Force apparently was unaware, was established in 1990 to help guide policy. The Board has 28 members representing a wide range of organizational perspectives and fields of expertise, including the National Laboratories. EMAB subcommittees exist to address key issues, including risk management, cost-effective cleanup, and technology development and transfer. **Deadline**: NA
4. *The national laboratories should play a larger role than at present in ... the Environmental Management program.*	Support, with qualifications	**Commitment:** The Department will continue to provide strong support to the National Laboratories for environmental clean-up technology development. In FY1995, DOE laboratories will receive $150 million (45%) of the Environmental Management program's $336 million technology development effort. Lead labs recently have been established for the major Environmental Management Technology Development Focus areas, as recommended in the Task Force report. Cost and performance of the DOE labs vis-a-vis other R&D performers will provide the basis for decisions regarding future funding allocations. Efforts to reduce the cost of business at the National Laboratories should enhance their competitive position for funding increases in this and other areas of R&D. **Deadline**: Role of the labs in the Environmental Management Technology Development program will be examined during summer 1995, in conjunction with FY 1997 budget development.

Weapons Site Clean-Up		
Recommendation	**DOE Position**	**Action**
5. *The national laboratories should be available to the entire government system as a powerful environmental technology resource.*	Support	**Commitment**: The Department strongly agrees with this recommendation and will continue to work with other Government agencies to help facilitate enhanced utilization of the Laboratories in areas where laboratories' technology capabilities might help provide cost-effective R&D solutions. The Department and/or DOE laboratories currently have Memorandums of Understanding with other Executive Branch entities including: the Department of Defense, Department of Health and Human Services, National Institute for Standards and Technology, Environmental Protection Agency, Department of Agriculture, and Department of Transportation. These agreements help provide the framework for making the National Laboratories available as a national resource. The Department will work aggressively with other agencies to match laboratory capabilities with national R&D needs. **Deadline**: Comprehensive report on work for other agencies performed by the National Laboratories will be presented to the Lab Operating Board, summer 1995, with plan for making labs more available as a national resource.
6. *DOE must address more forcefully the task of renegotiating the unrealistic or unfeasible elements of the cleanup compliance agreements that it has made with State and Federal agencies.*	Support	**Commitment**: Budget realities are forcing the Department to continue its renegotiation of many existing compliance agreements, thus creating a more workable, affordable, and results-oriented compliance regime. Considerable progress already has been made, including the 1993 renegotiation of the Hanford agreement at a savings of more than a billion dollars, and renegotiation of dozens of smaller agreement throughout the country. The Department is committed to making structural changes to our compliance agreements to provide the necessary flexibility because of shifting site conditions and budget realities. For example, we are seeking to replace elaborate long-term enforceable schedules with enforceable shorter-term schedules with greater emphasis on results-oriented milestones rather than process milestones. **Deadline**: Restructured program, involving $4.4 billion cost reductions over five years, will be put in place during 1995.

Weapons Site Clean-Up		
Recommendation	**DOE Position**	**Action**
7. *Much more comprehensive involvement by members of the affected public in decision making should be employed to reduce the bitterness, distrust and distress that continues to provide a troublesome element in DOE's conduct of affairs.*	Support/ Partially Completed	**Commitment**: The Department agrees that public and stakeholder involvement is vital, and has already taken a number of major actions to accomplish this goal. For example, in the Environmental Management program, the Assistant Secretary established the Office of Public Accountability. Other initiatives include the expansion of the Environmental Management Advisory Board, the formation of numerous Site Specific Advisory Boards (SSABs) at many DOE sites, and a technology development program that incorporates public input. Since 1993, "Establishing a stronger partnership between the Department of Energy and it Stakeholders" has been one of the six strategic goals of the Environmental Management program. Independent surveys have demonstrated significant improvements in the public's trust and confidence in the Department. **Deadline**: Public involvement is being structured into the Environmental Management Program on a continuous basis.
8. *The bulk of EM environmental challenges, although presenting no immediate threats to public health or safety, still should be addressed with a heightened sense of urgency.*	Completed, within budget limits	**Commitment**: Although the Department generally agrees with this statement, limited resources will ultimately determine the pace at which these risks can be addressed. Hence, the Environmental Management program's first strategic priority is to "Eliminate and manage the urgent risks in the system." This goal reflects the reality of limited resources available to the Environmental Management program. Some actions must be deferred where there is no near-term urgent risk, and to invest in new technologies that will reduce the cost and increase the effectiveness of a more sustainable remedy. This strategy recognizes the need to focus available funding on existing urgent risks and to identify emerging risks, while developing productive and cost-effective technologies for the long-term success of the program. **Deadline**: Established by management plans and vulnerability studies at each site.

Science-Engineering		
Recommendation	**DOE Position**	**Action**
1. *The Department of Energy should move to strengthen its efforts in fundamental science and engineering, both at the laboratories and in the universities.*	Support	**Commitment**: The Department has taken two important actions in its FY 1996 budget request to strengthen efforts in fundamental science at the labs and universities: 1) In high energy physics, DOE has responded to the Drell report to revitalize the program in the wake of the termination of the Superconducting Super Collider (SSC). Increased funding will provide additional support for university groups that were funded directly by either the Federal Government or the State of Texas through the SSC project. In addition, it will provide some initial funding to allow both universities and the Department's high energy physics laboratories to explore possible areas of collaboration in the Large Hadron Collider to be built at CERN, and 2) The $100 million Science Facilities Initiative will provide about a 30% increase in output of basic science from the Department's scientific user facilities, benefiting several thousand researchers in universities, the national laboratories and industry. We will assign the Laboratory Operating Board with the task of monitoring the Department's investments in fundamental research. **Deadline**: FY 1996 Implementation of Drell Report recommendations and Science Facilities Initiative.
2. *The DOE should pay close attention to ensuring that a proper balance is maintained between the universities and the national laboratories in the performance of DOE related basic research, both now and in the future.*	Support	**Commitment**: During the next year, the Department will request its science advisory committees to examine the balance between university and laboratory research programs in those instances where this has not been done recently. **Deadline**: Review should be complete in all major categories of DOE science funding during 1995, and presented to the Lab Operating Board.

Science-Engineering		
Recommendation	**DOE Position**	**Action**
3. *Support for operating and maintaining large facilities in the DOE's Office of Energy Research should be budgeted separately from funds for specific programs.*	Oppose	**Commitment**: The Department does not believe that the recommendation would provide significant benefits, and could greatly reduce management's flexibility to respond to unexpected needs in either research or facility operations funding. Research and facilities are not unrelated in the sense that a considerable amount of funded research depends on operation of facilities. For example, a facility could require extensive, unexpected repair, but would not have sufficient funds in a separate facilities account. Without the ability to quickly move funds to fix such a problem, a considerable number of scientists and their research in universities and industry as well as the national laboratories could be adversely affected causing considerable losses in productivity. Conversely, there might be a need in a research program that could be best met by moving facilities operating funds to support the research. **Deadline**: NA
4. *The DOE should redouble its efforts to achieve better integration of basic research, technology development programs, and their applications, particularly in the area of environmental remediation.*	Support	**Commitment**: The Department is committed to fostering the timely transition of research results from fundamental discovery to functional application. There already exists considerable interaction between the Department's basic and applied research programs. One of the most effective means of integration is through the collocation of basic and applied research. While there are many integration activities already underway, we agree with the Galvin report recommendation that improvement is necessary. There is an urgent need to better integrate research related to environmental management. In that regard, we will establish a Research and Development Council at the Assistant Secretary/Deputy Assistant Secretary level, reporting to the Under Secretary, to ensure high level support for integration of basic and applied research programs. This Council would provide policy guidance for various integration activities, e.g., development of technology road maps for the applied programs that require advances in basic research. More specifically, the Office of Energy Research and Office Environmental Management will develop an integrated strategic plan for coordination for R&D. Workshops involving the scientific community (including representatives from the labs) and environmental cleanup experts will facilitate development of this plan. **Deadline**: The Council will be established by the end of May 1995.

Science-Engineering		
Recommendation	**DOE Position**	**Action**
5. *Basic Research at the laboratories should be more fully integrated into the national and international research community.*	Support	**Commitment**: The Department agrees with this recommendation. However, implementation will vary from one field of research to another. Research in the fields of high energy physics, nuclear physics, fusion energy, human genome, and global climate change already are tightly integrated nationally and internationally. Several interagency and international agreements ensure this integration. The Department will undertake a broad examination of this issue using its advisory committees and will seek their recommendations to better integrate research activities not captured by existing frameworks between the labs and other R&D performers. The Science Facilities initiative will help foster additional interrelationships between the labs, industry, and academia. **Deadline**: Review complete by end of December 1995.
6. *There should be additional stimulation of laboratory-university cooperation in basic research.*	Support	**Commitment**: Existing laboratory-university relationships are very good in some areas, but not as strong as they might be elsewhere. These interactions are particularly strong at the scientific user facilities. In addition, there exist many very strong cooperative research activities between the laboratories and universities. Intellectual renewal is facilitated through cooperation between the laboratories and universities. To enhance the level of interaction, the Department will, as a matter of policy, encourage and reward its laboratories for establishing cooperative research programs with universities and consortia, especially for Centers of Excellence with universities and industry as partners in laboratory basic research. In addition, we will implement improved means for remote access to DOE user facilities as a means of achieving enhanced integration of the laboratories into the national R&D infrastructure. **Deadline**: Policy guidance aimed at further encouraging cooperative research between the Labs and universities will be issued by the Secretary by June 15, 1995; pilot projects in remote access of DOE user facilities will be established during calendar 1996, beginning with the Advanced Photon Source.

Economic Role Of The Labs		
Recommendation	**DOE Position**	**Action**
1. *The government-funded technology transfer/industrial competitiveness activities of the national laboratories should be focused on industries and areas of technology that contribute to the DOE's primary missions in national security, energy and environment.*	Support	**Commitment**: The recommendation will be fully implemented by the imminent issuance of criteria for partnership formation. The criteria, which have been in preparation for months, require all partnerships to: 1) Support core missions; 2) provide economic and other benefits to the nation; 3) have clear measures to ensure performance and accountability; 4) be formed in a fair and open manner; and 5) be managed by best business practices. **Deadline:** Criteria will be issued by March 31, 1995, for immediate implementation, and their use will be reviewed within six months.
2. *Laboratory directors should have the flexibility to initiate or to approve new technical projects at the periphery of current laboratory activities.*	Support	**Commitment**: The Department will examine and clarify guidance on the appropriate use of laboratory directed research and development. Laboratory directors currently have discretionary funds that they may use to initiate new technical projects at the periphery of current missions. Laboratories are allowed by statute to use these for industrial partnerships. **Deadline**: Guidance clarified by March 31.
3. *Competitive selection and more rigorous technical and merit review by external experts should be applied within the Department's CRADA activities.*	Support, with quailfications	**Commitment**: The Department will examine its existing CRADA review and selection process to seek opportunities to expand competitive selection and technical and merit review by external experts. The Department is committed to a rigorous, criteria based, CRADA selection process. We believe that competitve selection and external peer review is appropriate for some but not all classes of CRADAs. For small CRADAs, for example, the benefits from external review may not be worth the cost and time to conduct the review. Similarly, when a potential partner comes to us with a propriety problem and proposes a cooperative research program that is in the Department's interest, it may not be appropriate to require competitive selection. **Deadline**: Review complete by June 1, 1995.

Governance		
Recommendation	**DOE Position**	**Action**
1. *Over a period of two years, the Department and Congress should develop and implement a new modus operandi of Federal support for the national laboratories based on a private sector style - "corporatized" - laboratory system.*	Oppose as delineated; support in modified form	**Commitment**: The Department supports development of a new modus operandi for the National Laboratories, but believes the goals established by the Galvin Report can be accomplished within the existing Government-Owned, Contractor-Operated model. We are committed to achieving these goals through implementation of the Management Improvement Roadmap which has been described elsewhere. This approach addresses issues raised in Appendix B of the Task Force Report. A Lab Operating Board will be established to achieve enhanced performance and efficiency of the National Laboratories. **Deadline**: Establish Lab Operating Board by March 31, 1995; implement each element of Management Improvement Roadmap (deadlines also listed at beginning of this chapter): 1) New Rules of the Road for Lab Management immediately; 2) Reform/Reduce Directives: 50% reduction in DOE orders by December 31, 1995; 26 most burdensome orders reissued by July 31, 1995; implementation of five "necessary and sufficient" pilot projects Fall 1995; 3) Report from Advisory Committee on External Regulation by December 1995; 4) Reform Audits/Appraisals through immediate moratorium of business practice reviews and revision of audit system; 5) Procurement reform through rulemaking that eliminates "federal norm;" final rule by summer 1995.

Mr. CURTIS. I am sure you will have questions on this matter and I will reserve further comments until that time. I do want to also draw attention to another of the Department's initiatives, an initiative in support of our national nonproliferation goals through efforts to improve the protection, control, and accounting of nuclear materials in Russia.

The Department has long been actively engaged in protecting nuclear material and facilities, and maintains a range of unique technical capabilities in support of U.S. nonproliferation policy.

This committee has funded and supported these activities over the years. The challenges in the area of material control and accounting are clear. The collapse of the Soviet Union has raised concerns about the adequacy of the security of nuclear materials in the successor states, and concerns about the fate of the former Soviet weapons scientist in a system that can no longer support their employment.

Over the past year, we have made significant progress in reducing the global nature of these materials, through establishing a program of cooperation between the Department's laboratories and nuclear research facilities in Russia to improve the protection and control of nuclear materials in those states.

We must accelerate these efforts in fiscal year 1996. Our fiscal year 1996 budget request provides us the means to significantly augment this initiative. We look forward to working closely with the Congress on this urgent matter.

Finally, I should speak to the issue of the elimination of the Department of Energy, and share with you my concerns for such an approach at this time. The wisdom of maintaining the technical independence of the Department of Energy from the Department of Defense on nuclear issues has been confirmed in study after study, the last as recent as 1990.

This separation of roles and responsibilities is rooted in the history of the end of World War II and the McMahon Act. But the rationale underlying the separation of roles is perhaps best recently stated by the Galvin commission to which I earlier referred in its report on the laboratories.

The report states, "There is much value at this time in maintaining an independent and technically expert organization to focus on nuclear stockpile issues and to continue to ensure that decisions regarding safety, control, and stewardship of nuclear weapons are raised to the high policy level that they deserve."

It is of course a respective and a sensible question in the post-cold-war environment to ask whether this function could now safely and sensibly be transferred to the Department of Defense. I believe that your consideration of this question will lead you to the conclusion that this is not the time.

The success of the stockpile stewardship program is largely dependent on the continued vitality and expertise of our nuclear weapons laboratories. Shifting these laboratories to the Department of Defense, in my judgment, would risk their suboptimization to a narrower defense only mission, thus eroding the vitality of the laboratories at an important and historic juncture in the weapons program, when the challenge to the maintenance of the core intellectual capacities of these laboratories is greatest.

Their ability to retain and refresh that talent in my judgment is especially dependent on their capacity to maintain their multipurpose character, and they are best able to do that in the context of a civilian agency.

Mr. Chairman, in the final analysis, the budget that we have submitted to you we believe is responsible and appropriate, and it deserves your support. I will welcome your questions.

Mr. HUNTER. Thank you, Secretary Curtis.

Dr. Smith.

STATEMENT OF DR. HAROLD P. SMITH, ASSISTANT TO THE SECRETARY OF DEFENSE ATOMIC ENERGY

Mr. SMITH. Thank you, Mr. Chairman. It is a pleasure to appear here, particularly before my Congressman of many years, Mr. Dellums.

I am here in the capacity as the Assistant to the Secretary for Atomic Energy, and as such, I have direct responsibility to Dr. Perry for the safety, reliability and effectiveness of the nuclear weapons stockpile.

I want to commend you, Mr. Chairman, for your statement on our strategic posture. You are quite correct. Nuclear deterrence is No. 1, and therefore the stockpile is a very primary concern to the Department of Defense.

In that respect, these are indeed difficult times. The stockpile that we have in our arsenal today is almost the oldest on record. In a few short months it will be the oldest stockpile we have ever had. And then of course it will continue to age day by day from that point on.

We have a reduced budget and reduced infrastructure, as Mr. Curtis has just said, that is quite appropriate given the changing conditions in global posture.

We have decided it is in the best interests of the United States, our allies in the world, that we enter into a comprehensive test ban, that we continue the moratorium on testing, and therefore we have the oldest stockpile, reduced budgets, the inability to test, and at the same time we must ensure that the weapons are safe, effective, and reliable. We must meet the same exacting conditions in the post-cold war era as we did during the Cold War.

Let me describe the relationship between the Department of Defense, Department of Energy, in customer-supplier metaphor. First of all, it is up to us to provide to the Department of Energy what the requirements are. We have done so in the nuclear posture review, which was approved a few months ago by the President himself.

It embodies Dr. Perry's statement of leading, but hedging; that is, it is our intent in Department of Defense [DOD] to reduce the number of weapons in the active stockpile at a pace that shows the world where we are going but not at such a pace that we cannot recover.

If there are changes in the world environment, certainly if there is a renascent Soviet Union, we insist that we have the ability to return to the levels associated with START I, and, if necessary, of course, we will go higher. So we have quantified in the [NPR], the nuclear posture review, the concept of leading and hedging.

In the sense of leading, we have no longer any ground combat troops with nuclear weapons. We have no tactical nuclear weapons at sea. Our strategic bombers are no longer on alert. The amount of storage facility for nuclear weapons in the active stockpile has been reduced by 75 percent.

The number of personnel who watch over those weapons has been reduced by 70 percent. Having done this, though, we must maintain the ability to hedge, and therefore the nuclear posture review calls for increased stockpile surveillance, the ability to refabricate weapons if necessary, the capability even to design new weapons if necessary; to develop a science and technology base; and to maintain a strategic reserve of special nuclear material, including the very important element, tritium, that you mentioned, Mr. Chairman.

We are very satisfied with the nuclear posture review. We feel it does set down quite clearly what the requirements are.

Now, the problem is to ensure that those requirements are transmitted very precisely and very clearly to the Department of Energy. That we do through the nuclear weapons stockpile memorandum. In this world of acronyms, it is sometimes referred to as the NWSM, the nuclear weapons stockpile memorandum.

That memorandum sets forth in explicit quantitative terms exactly what weapons we require over the next six years, and in less precise terms, gives a view beyond that period of time.

There can be no doubt from the point of view of the customer of the Department of Defense that our supplier is very well informed on what it is we need with regard to nuclear weapons. Having sent the order over, so to speak, how do we provide oversight to see that those orders are filled? We do that through the nuclear weapons council that is composed of three members. Mr. Curtis represents the Department of Energy, the vice chairman of the Joint Chiefs of Staff represents the operational arm of the Pentagon, and the Deputy Secretary of Defense, Dr. Deutch, or, one presumes Dr. Deutch will be moving to the CIA, then Dr. Kaminsky, the Under Secretary, will chair the Nuclear Weapons Council.

I have the pleasure of serving as the Executive Secretary for the council, and I am well supported by a standing committee composed of DOE and DOD, especially [JCS], Joint Chiefs of Staff, representation.

This committee is decisive and hard hitting. The activities of the past few months certainly show we are willing to take on those questions that concern the relationship between the departments and to resolve them expeditiously and clearly. It is a superb oversight mechanism by which we ensure that the knew so many, the stockpile memorandum, is indeed followed.

We require one more step in this management chain to make sure that we are a well-supported customer, and that is we have to know that the weapons in the active stockpile are, as you said, Mr. Chairman, safe, effective and reliable. In the absence of testing, we are relying on peer review, and therefore we are most inconsistent that the Department of Energy maintain the ability to provide two independent reviews of each weapon in the stockpile. And we have in the Department of Defense the obligation to be an educated customer, that is, we must have the ability to understand

whatever the laboratories and the Department of Energy have to say about the condition of that stockpile. And we are taking steps to ensure that we are an educated customer.

Given the above, and given the efforts the Department of Energy is making under Mr. Curtis's leadership, we are confident that the stockpile is safe, secure, and reliable. We have examined both as a department and as the Nuclear Weapons Council the budget submitted for fiscal year 1996, and we have looked at the amount of money budgeted for the out years.

We find these sums and the plans that underlie them to be adequate, minimally so, but nonetheless adequate, and therefore the Department of Defense does support the budgets that are before you this year.

With that, Mr. Chairman, I would like to bring my comments to a close. I am ready for your questions. I appreciate the opportunity to be here.

Statement by Dr. Harold P. Smith, Jr.,
Assistant to the Secretary of Defense (Atomic Energy)
before the
House National Security Subcommittee on Military Procurement

Introduction

Mr. Chairman and members of the Subcommittee, I am honored and delighted to have this opportunity to appear before you. My remarks will focus on the relationship between the Departments of Energy and Defense in meeting our shared responsibility for the continued safety, security, and reliability of our nuclear weapons stockpile. This stewardship responsibility is particularly challenging since the nuclear weapons of our enduring stockpile will be retained in the inventory well beyond their designed lifetimes. Given this reality, I accord nuclear weapon safety, security, and reliability the highest priority. I am pleased to report that the Defense Department and Energy Department are working hand-in-glove in executing our shared responsibility.

The Nuclear Posture Review

As the starting point for my remarks, I would like to comment on the requirement for an enduring nuclear stockpile. Why do we need nuclear weapons at all in the future? This question was the

starting point for a lengthy, zero-based, major review of the nation's future nuclear weapons requirements, the Nuclear Posture Review or NPR. This review was the first such comprehensive review in fifteen years. Completed this past September and approved by the President, the NPR provides the policy guidance, force structure requirements, and stewardship obligations for the enduring nuclear weapons stockpile. In effect, the Nuclear Posture Review was the nuclear companion to the Defense Department's Bottom Up Review which guides the conventional component of our national security strategy.

The NPR recognized that the size and posture of the US Cold War nuclear deterrent is excessive to future security challenges. However, in a world of uncertainty and still evolving security needs, the NPR concluded that nuclear weapons -- and nuclear deterrence -- will remain an essential element of US national security. However, the size, form, and context of that deterrent is significantly different from that which served us so well during the Cold War.

First, the NPR sought to achieve a proper balance between what Secretary Perry has called "leading and hedging." By this, he means providing the leadership for continuing reductions in nuclear weapons while at the same time retaining the ability to respond to the emergence of a new nuclear threat, including a possible reversal of trends in Russia, a nation that currently has over 25,000 nuclear weapons. A credible US nuclear deterrent also

serves us and our Allies and friends by discouraging the use of weapons of mass destruction developed or otherwise obtained by regional aggressors.

The force structure resulting from the NPR is significantly reduced from that of the Cold War. This force structure will be comprised of 14 Trident ballistic missile submarines, 66 B-52 and 20 B-2 bombers, and three wings of Minuteman III ICBMs with each missile downloaded to a single-warhead. Dual-capable aircraft are being maintained only in Europe and the United States. Regarding naval non-strategic nuclear weapons, all that will be retained is the capability to deploy nuclear-armed land-attack Tomahawk missiles on nuclear-powered attack submarines.

This equates to a 47 percent reduction in active strategic warheads and a 90 percent reduction in active non-strategic warheads from the 1988 level. Overall, compared to 1988, the total active stockpile has been reduced by 59 percent. This reduction will reach 79 percent by 2003.

Second, the NPR focused heavily upon improved safety and security for the residual nuclear force. In addition to reducing the sheer size of the active nuclear inventory, a number of additional actions have been or are being taken to improve nuclear safety, security, and use control. For example, no nuclear weapons remain in the custody of US ground combat forces. Non-strategic nuclear weapons are no longer deployed at sea.

Strategic bombers remain off day-to-day alert. Furthermore, nuclear weapons storage locations have been reduced by 75 percent and personnel with access to nuclear weapons or their control have been reduced by 70 percent.

The NPR also directs the Departments of Defense and Energy to maintain nuclear weapon capability without underground nuclear testing and without the production of fissile material. Specifically, it directs the development of a stockpile surveillance engineering base; retention of the capability to refabricate and certify weapon types in the enduring stockpile; maintenance of the capability to design, fabricate, and certify new nuclear warheads should that prove necessary; and maintenance of the requisite supporting science and technology base.

Meeting the Challenge

To meet these challenges, the Department of Defense, in partnership with the Department of Energy, must address three basic issues. First, how does DoD, as the customer, determine the requirements and characteristics for the future stockpile? Second, how are these requirements communicated to the supplier, the Department of Energy? Third, how do the two Departments most efficiently maintain that stockpile?

As I already mentioned, the NPR stands as a pivotal document to define DoD's requirements for the stockpile. The NPR defined

the outyear force structure requirements and also provided the basis for developing and establishing necessary refurbishment and replacement materials. This in turn established the requirement for a professional cadre of technical nuclear design personnel to ensure that the safety, security, and reliability requirements are met. Furthermore, the NPR requires that this nuclear expertise include the capability to design, fabricate, and certify nuclear warheads in the absence of testing and fissile material production. To support these requirements, a Strategic Reserve of highly enriched uranium, weapons grade plutonium, and tritium must be maintained. The process for ensuring the provision of these essential capabilities is conducted through the Joint DoD/DOE Nuclear Weapons Council.

The Nuclear Weapons Council

The Nuclear Weapons Council is an interdepartmental (DoD and DOE) organization which manages, reviews, and arbitrates nuclear weapons issues relative to the maintenance of a reliable, safe, and secure stockpile and supporting infrastructure. As an interdepartmental organization, the NWC is supported by a wide-range of disciplines: security and safety experts, designers, producers, managers, maintainers, and operators. Membership of the NWC consists of the Deputy Secretary of Defense, Under Secretary of Energy, and the Vice Chairman of the Joint Chiefs. The Council is supported by the NWC Standing and Safety Committee, which I chair.

A central activity of the NWC is the preparation of the annual Nuclear Weapons Stockpile Memorandum which provides the Defense Department's nuclear weapons requirements to the Energy Department. The Council prepares this document, oversees its implementation, and ensures that national policy is being efficiently executed.

Issues considered and addressed by the NWC this past year include a myriad of detailed questions impinging on the stockpile of today and tomorrow. Among the topics addressed this past year were the impact of declining budgets, the retirement of weapons and weapon types; the long-term storage of fissile material; identification of nuclear materials for International Atomic Energy Agency (IAEA) safeguards, and the impact of mission realignment and base closures. Considerable time and effort was directed toward issues related to the aging of the stockpile. In particular, the Council wrestled with ways to best maintain confidence in individual weapon and collective stockpile safety, security, and reliability.

As an example of a key decision with long-term implications, the Council recently considered alternative source and production programs to ensure a future supply of tritium. The Council concluded that accelerator-based tritium production could meet the needs of the enduring stockpile.

Stockpile Stewardship Program

An additional requirement directed by the Fiscal Year 1994 National Defense Authorization is: "a stewardship program to ensure the preservation of the core intellectual and technical competencies of the United States in Nuclear Weapons." The Department of Energy, with the support and concurrence of the Defense Department, has established the Science Based Stockpile Stewardship Program. This program is designed to retain the capability to design and produce replacement weapons while simultaneously dismantling obsolete weapons under the tightest safety and security provisions. In particular, the Stockpile Stewardship Program will provide improved forensic and diagnostic capabilities.

Independent Assessment

As the stockpile decreases with a concomitant increase in demilitarization requirements, a parallel and critical activity is the technical evaluation of the weapons remaining in the stockpile. The basic elements of such an evaluation are in place in the form of the nuclear competencies of the national laboratories and the DoD. The Stockpile Stewardship Program will build on these centers of nuclear excellence by developing a robust peer review process with both DOE and DoD participation. This peer review process will provide a technically sound

structure and methodology to ensure a safe, secure, reliable nuclear weapons stockpile.

Conclusion

I can confidently report today that the stockpile is safe, secure, and reliable. It also meets the requirements of DoD and the Services. The Fiscal Year 1996 budget request provides sufficient funding to meet our responsibilities.

For the future, the combination of the Stockpile Stewardship Program, aggressive stockpile surveillance, and a robust program of independent peer review provides the means to partially offset the loss of nuclear testing. However, without testing, there will be potential for erosion in the degree of confidence in the individual and collective characteristics of the stockpile. Maintaining confidence will be challenging in such an environment but I believe that we are on the right track to address this critical issue.

Since the Manhattan Project, the nation has invested heavily in the development, production, deployment, and maintenance of the national nuclear deterrent. Nuclear weapons, even at significantly reduced levels, remain a core component of future national security strategy. Proper stewardship is, therefore, an enduring responsibility. It is imperative that the nation continue to provide the resources to fulfill this responsibility.

Mr. Chairman, this concludes my statement. I hope that I have been responsive to your needs. I would be pleased to answer your questions and those of your colleagues.

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Mr. HUNTER. Dr. Smith, thank you for your statement.

Mr. Baker, and then we will have Dr. Reis.

STATEMENT OF KENNETH BAKER, DIRECTOR, OFFICE OF NONPROLIFERATION AND NATIONAL SECURITY, DEPARTMENT OF ENERGY

Mr. BAKER. Good morning, Mr. Chairman, and members of the subcommittee.

It is a pleasure to address you today as the acting Director of the Office of Nonproliferation and National Security at the Department of Energy. Or activities focus on three areas: reducing the global nuclear danger; providing effective, cost-efficient safeguards and security of the DOE complex; and improving the department's emergency response capabilities.

Nuclear nonproliferation has become one of the highest national security priorities and the Department of Energy is leading the way in providing technical and analytical support to United States and international nonproliferation efforts. We perform aggressive research and development activities in support of national and international nonproliferation concerns. Specifically, proliferation detection technology and treaty verification.

We provide timely and customized intelligence to define this serious national security problem for the United States. Over the past year, we have made significant accomplishments in reducing the global nuclear danger. Our program of cooperation between DOE laboratories and the nuclear research facilities in Russia to improve protection, control and accounting of nuclear weapons material is yielding dramatic results.

At Kurchatov Institute on the outskirts of Moscow, the United States and Russia jointly collaborated to secure weapons grade nuclear materials. The pace of this improvement was extraordinary. The work was completed in 3 months. The cost was modest, just shy of $1 million.

With your permission, Mr. Chairman, I would like to show you a couple of charts of Kurchatov that we did last September. The chart on your right is the before picture. This is building 116 at Kurchatov. It had weeds up. When we went into the facility there was no radiation detection system. There was no alarms. There was no—there was one guard. After we got inside of it, there were lockers like you would see in a college locker room with bicycle-type locks. We opened up the locker and found enough highly enriched uranium to build three weapons of the size that were exploded over Nagasaki.

After we took action, we spent a million dollars, you can see what we did. We put cameras in, we put a new fence in, we put new radiation detection systems in so people could not walk out in a lunch box and carry highly enriched uranium. And we put a new computer system in. We did this in a very short period of time. This type program we want to expand in the coming year with a promise of securing not tons of weapon useful material, not just kilogram qualities.

Last November we successfully transferred approximately 600 kilograms of highly enriched uranium from Kazakhstan to the department's Oak Ridge facility in Tennessee for safe and secure in-

terim storage. By gaining ownership of this material, the United States has effectively removed it from potential acquisition by those who could develop weapons of mass destruction.

We have developed a deployed space-based sensors capable of detecting atmospheric and near earth nuclear explosions. These sensors are on Defense Department satellites and provide a system for the United States to continuously detect nuclear explosion and verify treaty compliance worldwide.

During 1994, we were assigned the responsibility at U.S. Government's primary agency for research and development of technology supporting U.S. requirements to monitor a future comprehensive test ban treaty.

We also provide technical expertise and pole recommendations in support of diplomatic efforts to achieve an indefinite extension of the nonproliferation treaty, a cornerstone of U.S. national security policy.

In addition to these accomplishments, there is still much more to do. Our requested increase of $86 million over fiscal year 1995 will allow us to accelerate these essential nonproliferation efforts and reduce the global nuclear danger.

The department will expand its efforts to end the civilian production and use of weapons usable physical ill materials. We will continue our efforts to monitor United States, and Russian inventories of plutonium and highly enriched uranium from weapons dismantlement with a goal of ensuring that dismantlement is irreversible.

Among other measures, we will advance nonproliferation by our efforts in North Korea, by supporting negotiations for a comprehensive test ban treaty, and an international physical ill material cutoff convention, and by facilitating International Atomic Energy Agency activities worldwide.

Our unique experience and support of national and international nonproliferation policies is supplemented by efforts to develop cost efficient safeguards in the DOE complex. Over the past year we have reduced department-wide safeguards and security costs by 12 percent, without degrading security.

The costs have come down through consolidation of nuclear material at DOE sites. Improved safeguards in security planning, elimination of redundancies, and effective use of state of the art technology, and reducing the number of security clearances.

We are also improving the trust held by the American people, by spearheading the department's openness initiative. We have an active program to declassify information about the department's activities, and we are enabling greater access to the department and its facilities.

All these activities are done consistent with national security objectives. I would like to emphasize again that any changes we have made in the safeguards and security program have not degraded our security posture.

We are learning to meet security challenges of today with less. And we are being successful in this endeavor.

Finally, the Office of Nonproliferation and National Security seeks to include proof of the department's emergency response capability. Our primary responsibility is to provide quick response to

merge situations concerning the Department of Energy. Over the last year, the department's ability to effectively respond to emergencies has been enhanced by improved training, procedures, and facilities at DOE sites.

In summary, the 1996 request if granted will allow the Department of Energy to continue to reduce the global nuclear danger, provide efficient, cost effective safeguards and security while fostering public trust, and provide effective emergency response under any condition.

I will be happy to address your questions. Thank you.

Mr. HUNTER. Thank you, Mr. Baker.

We will finish this panel with the testimony of an old friend, Dr. Vic Reis.

Dr. Reis, thank you for being with us.

STATEMENT OF DR. VIC REIS, ASSISTANT SECRETARY OF ENERGY, DEFENSE PROGRAMS

Mr. REIS. Thank you, Mr. Chairman.

My name is Victor H. Reis and I am the Assistant Secretary for Defense Programs. I appreciate the opportunity to testify before this committee today. I just realized now this is now my fifth consecutive year of testifying for this committee.

Mr. HUNTER. You have our condolences.

Mr. REIS. Thank you. I notice the committee keeps getting younger.

Mr. SKELTON. Thank you.

Mr. REIS. That is for you too, Mr. Dellums.

Mr. Chairman, the defense program's President's budget request for fiscal year 1996 is $3.5 billion. This is an increase of 9 percent over the equivalent 1995 appropriation. This is a large increase, in a tough fiscal climate, and it is the first request for an increase after 4 years of sharp decline.

But the significance of this request is not its change in funding but its change in programmatic direction. In the aftermath of the cold war, the United States has reduced the number of nuclear weapons by 59 percent and plans to reduce the number by 79 percent by 2003.

We have ceased production of new nuclear weapons. For defense programs this has meant turning over most of the Department of Energy's production plants, Hanford, Rocky Flats, ID, K–25 at Oak Ridge, Mt. Pinellas, to our environmental development and waste management office. This year we continued that process by transferring the Savannah River site.

Reducing the number of active warheads requires an aggressive dismantlement program and we continue dismantlements at the maximum rate in fiscal year 1996.

These steps are one phase of our response to the ending of the cold war. To go further, we must define the future role of nuclear weapons and the character of the nuclear weapons stockpile.

This was done in the Department of Defense's nuclear posture review, approved by President Clinton. It affirms that continued maintenance of a safe and reliable U.S. nuclear deterrent remains a cornerstone of U.S. national security policy.

The President further directed the Department of Energy to initiate a stockpile stewardship program whose objective is to maintain a high level of confidence in the safety, reliability and performance of the U.S. nuclear weapons stockpile without nuclear testing and new weapon production.

Stockpile stewardship was first codified by the Congress in the fiscal year 1994 Defense Authorization Act.

These directives define the future product of the defense programs and shape the new post-cold war program. Defense programs are charged to deliver a high confidence, affordable, reliable, safe and secure enduring stockpile, while simultaneously supporting U.S. arms controls and nonpro-life operation policy.

Because the stockpile must endure, we require a production complex to replace the stockpile when need, including limited life components and tritium, and because the world is uncertain, we need the ability to reconstitute test and production.

President Clinton envisioned a future that includes dramatic advances in nuclear arms control while simultaneously retaining nuclear deterrence. The nuclear posture review calls this lead plus hedge. This is an extraordinarily difficult and demanding task.

To ensure weapons confidence, we must replace empiricism with deeper scientific understanding of weapons and weapons physics. Because we must plan on weapons lasting well beyond their design life, we must measure and understand weapons aging processes sufficiently to predict and fix problems before they decrease stockpile confidence.

We must develop production techniques to reduce the cost of maintaining and rebuilding weapons and we must maintain our ability to test in a meaningful way if we are to avoid testing. All this represents a world-class challenge.

To meet this challenge, we are requesting the start of a new program, science-based stockpile stewardship, and we would entrust its implementation to the three defense programs' national laboratories: Los Alamos, Livermore, and Sandia. These institutions are among the world's best scientific and engineering laboratories and have responded time and time again to problems of national imperative.

The fiscal year 1996 budget request begins this task. Some programs such as dismantlement and supplying limited life components for the active stockpiles remain relatively unchanged. Other programs such as our technology transfer program would be reoriented. But included within the fiscal year 1996 budget request are new programs that specifically respond to the President's challenge.

The first is the National Ignition Facility. When completed, the National Ignition Facility will be the world's largest laser installation. It would create conditions normally found only inside suns and nuclear explosions.

In fiscal year 1996 we would begin to apply neutron radiography to diagnose weapons material aging utilizing the Los Alamos Neutron Scattering Center, one of the world's finest such facilities, and we would begin to develop new computational ability.

We acquire much greater computational power if we are to have the integrated understanding that has heretofore only been avail-

able through underground testing. Also, within the fiscal year 1996 budget is a request for funds for a new source of tritium. The United States has not produced tritium since 1988 and has relied upon the surplus from dismantled weapons to keep the necessary active weapons supply.

The use of surplus tritium will only last until around 2011, so it is essential that we begin the development of a new tritium source now.

Mr. Chairman, these represent some of the highlights of the fiscal year 1996 defense programs budget request. It is a different budget than many of its predecessors, but these are different times. It responds directly to the requirements laid on the Department of Energy by the nuclear posture review, specifically recognizing the underlying need for nuclear strength as essential to reducing the nuclear danger.

I am looking forward to working with the committee, Mr. Chairman, and I am prepared to answer any questions that you might have.

Mr. HUNTER. Thank you, Dr. Reis, and thanks to all four gentlemen for your presentations.

Let me just start out with the basic. Dr. Reis, you have said it in so many words that this maintaining a safe, reliable nuclear weapon capability was a world-class challenge. The other gentlemen have described it similarly.

I guess my first question to you, and then to the other members of the panel, is, can we maintain safety, security, and reliability without testing, in your personal opinion? I understand that you are undertaking this challenge. You have been charged to do that. But in your personal opinion, do you have confidence that it can be done?

Mr. REIS. Certainly there are no guarantees, Mr. Chairman, on this. I think we can do it. I think if we fulfill and we implement the program we are laying out, I think there is a very good hands that we can make that happen, yes, sir.

Mr. HUNTER. If you were going to give odds on this——

Mr. REIS. Well, I usually do that with Senator Reid.

Mr. HUNTER. You are a poker player, Dr. Reis. Aren't you trying to fill an inside straight here?

Mr. REIS. I don't think we are trying to fill an inside straight.

Mr. HUNTER. Two of a kind?

Mr. REIS. Let me put it this way. In poker we know what the hands are. You know your opponents, what your opponents are. Frequently you have played with them before, you know what the game is, and so you know it isn't just the mathematical exercise. This is not just a mathematical exercise either.

We are entering a new era. Let me tell you why I feel reasonably confident that we can do this and we can pull this off.

One, we are starting with a solid base. As Dr. Smith has testified, we are starting with a nuclear stockpile right now that is safe and reliable and effective. We are starting with, I believe, a first-rate team. I mean, I believe the people in the laboratories, I believe the people in the production complex are literally the best in the world in what they are doing.

We have been working with them for now about 18 months, since July, when the President said, "That is your challenge."

I think you will find, and I am sure you will ask the second panel of the laboratory directors their opinion, and I have no doubt they will give you their honest opinion. I think we can pull this off, Mr. Chairman. But I think it will not be easy. It will need not just the support of the laboratories. It will need the support of your committee. It will need the support of the rest of the Congress to ask the tough questions.

I think we can provide you with the right answers. I think we are starting in the right—in fiscal year 1996 I think we are starting in the right direction. Our plans and where we are headed in the future I think supports the question that will provide you with that confidence, that will also provide you with the people, and I think that is very important, to be able to continually answer, you know, that question, so that—you know, if I could just continue on, because I think you have really hit upon the gut, you know, the gut issue.

I think part of it is to maintain the infrastructure to be able to provide that. When the President directed us to start this program, he also directed us to maintain the ability to go back and do that testing in the event we don't have that confidence. And I think that is part of the program, is maintaining that ability to be able to go back and do that, you know, do the testing if we ever feel that we no longer have that confidence and the people who are responsible enough and talented enough and competent enough to be able to continually answer that question. I hope that—it is a little more complicated than the poker game.

Mr. HUNTER. That is a tough question. Let me ask you further, you said the President wants to maintain the ability to go back and test it if we begin to lose confidence. My next question, maybe we can make this to Dr. Smith and Mr. Curtis, is, assuming we do lose some confidence over the years, you get a couple of bad reports, some external, maybe some internal to the program, and we feel that it is necessary to regain our confidence, we need to test.

Do you think it is reasonable that we are going to do that in the face of international agreements not to test? Do you think we will have the political will to turn the test ban on its ear because we have lost confidence? Or do you think we will just let this thing deteriorate?

Mr. Curtis, and then Dr. Smith.

Mr. CURTIS. You are asking me to consider a question in the environment of the successful conclusion of a comprehensive test ban treaty.

Mr. HUNTER. Right.

Mr. CURTIS. And whether if there were to develop a concern with the safety and reliability of the stockpile, that we could not resolve but for testing, would the Nation have the political resolve to resume testing.

Mr. HUNTER. Right. In other words, the technical people tell you they are losing confidence and it becomes a tension between the technical people and the political people who say: "This is going to turn this damn thing on its ear, we don't want to do it, and go back

and make it work without testing." That is my question. Shouldn't we better address that up front?

Mr. CURTIS. I think the fair response to that is, No. 1, the comprehensive test ban treaty will include a supreme national interest clause by which parties may withdraw from the treaty on terms yet to be discussed if it is in their supreme national interest.

Whether the Nation would exercise the judgment to resume testing, to resolve a question that threatened the safety and reliability of the stockpile, of course would be a question for the President of the day, just as it has been a question for the President in any day even in the absence of a comprehensive test ban, whether to test nuclear weapons.

After all, President Bush was the first to invoke the moratorium on testing, and that occurred in the absence of a test ban, and it has been extended by this President. But this President has also said that the maintenance of the nuclear deterrent is a cornerstone of our national security, and as such the maintenance of its confidence in the safety and reliability of the stockpile, I believe would be defined as a supreme national interest.

Mr. HUNTER. Thank you.

Dr. Smith, the same question. Will this be a bridge too far to ask the Nation to undo something as solemn as a test ban merely because our scientists say they are beginning to lose confidence in stockpile stewardship?

Mr. SMITH. I would like to make a twofold reply to that, Mr. Chairman. First of all, Mr. Curtis has correctly cited the supreme national interest clause. When it comes to——

Mr. HUNTER. We are all aware of those clauses, but we are also aware it takes an enormous amount of political will to exercise them.

Mr. SMITH. When it comes to predicting future political situations, and when it comes to whether or not the Nation's elected leaders have the political will to take the step that you refer to, I certainly feel that our positions are reversed. I would feel much more comfortable addressing you, an elected official, on this issue.

Mr. HUNTER. My guess is we won't have. That is my answer.

Mr. SMITH. Let me turn to the other side. It is not to say that the dire political world that you correctly envision or raise as a possibility—I want to point out the stockpile has a significant number of different types of nuclear weapons, which have been designed and built over a long period of time.

Therefore, I can say as a technical expert that it is highly unlikely that all of the different types of weapons would in the opinion of the technical community all begin to fail all at the same time when presumably a dire threat to the United States has arisen sometime in the future.

Because there are so many different types, at least a half dozen, I think we have—in fact, I am sure that we will have the wherewithal to remove whatever weapon type it is that is suspect, and to replace it with a weapon type that is not suspect.

There are two types of warheads that go on the submarine launch ballistic missiles, the SLBM. There are also two types of warheads that go on the ICBMs'. We could mix and match, so to speak, so that I think there is a technical way of viewing the prob-

lem which I think should alleviate to a great extent the political situation that you have put before us.

Mr. HUNTER. Thank you.

Dr. Smith, we will move on to our other Members, and we will have some other questions when we get finished.

The gentleman from Missouri, Mr. Skelton.

Mr. SKELTON. Mr. Chairman, I have only one question at this time. A key concern for the long-term maintenance of our nuclear arsenal is the retention and attraction of skilled and bright and building personnel. What steps are you taking to make sure we have that talent on hand for the days and years ahead? I will give that to the panel, whichever one wishes to answer.

Mr. REIS. I think it has been my experience, Mr. Congressman, in many years, that the way to retain skilled personnel in laboratories is by giving them a challenge and giving them the tools to work that challenge. And I think the science-based stockpile stewardship, as the chairman has represented, really is a very, very difficult and imposing challenge to do it. I think it will be this type of program that will attract, you know, the best and the brightest.

I am particularly enthusiastic in that regard for the National Ignition Facility, which you will see a request in our budget. I think that is one of the more—one of the important roles that that facility will play.

I think the work on the Los Alamos Neutron Scattering Center, that is indeed a world-class facility. We have a world-class neutron radiography to get that done.

I mentioned briefly the challenge in supercomputing that we will be facing for—it is probably if not the most difficult, certainly one of the most difficult computational challenges that we face in the future about how to pull all that information together as we look into programs.

So I think the program that we are suggesting, I think, takes that, you know, takes that effect directly into account.

Mr. HUNTER. I thank the gentleman, and we are privileged in our subcommittee hearing to have the chairman of the full committee and the ranking member of the full committee with us. We thank both gentlemen for being with us.

The chairman is recognized for any questions.

Mr. SPENCE. Thank you, Mr. Chairman.

Gentlemen, I appreciate your testimony this morning. I don't have many questions. I would like to ask just one. I have been sitting here thinking of the problem of nuclear waste disposal. And the waste is accumulating at our many facilities throughout the country, and the fact that we are taking in nuclear waste from abroad and still we aren't doing anything to deal with the fundamental problem of the disposition of it.

And I would like to hear your thoughts on why we don't—I think the new term is recycle now rather than reprocess. I have always thought that that was a good first step in trying to deal with the problem. We still won't take that step. And I want to know if you can tell me why, and if that might not be a good thing to do.

Mr. CURTIS. Mr. Chairman, let me try a response to that. The fuel returns to which you refer are U.S. supplied, highly enriched

uranium fuels for research and test reactors distributed throughout the world under the peaceful uses cooperative agreements.

We have a policy to return those fuel for safe storage and disposal in the United States, and it is a very important nonproliferation initiative. Highly enriched uranium is of course a direct weapons usable material. And these fuels by their characteristic are in size unlike a civilian nuclear reactor, the fuel rods are by length and weight quite easily portable.

So it is fundamentally important for nonproliferation goals that we have confident assurance that this fuel that this Nation supplied in the world that poses that risk is retrieved and taken out of commerce.

We have a research activity companion to this program which seeks to substitute low enriched uranium fuel rods that do not pose that proliferation risk. That is the underlying policy that we are trying to give effect to.

In many cases, these—in some jurisdictions in the world, these fuel rods, because they are by definition in custody of universities, are not subject to the type of security controls that we would be confident about, and they are urgently in some cases needed for address.

I agree entirely with you that we need as a Nation an effective and not yet determined strategy for dispositioning or disposing of these recovered fuel rods. And it is a concern to us all that our only current option is to receive these rods for temporary storage until that disposition strategy is first determined and then given effect.

But I can give you assurance that both the transportation and the storage of these rods can be conducted safely. Similarly, we receive the return of spent fuel rods from research reactors throughout the United States on a continual basis, and there has been no safety concern or incident associated with this program.

So I guess my answer to you, this is a very important program. I share your concern that the department has yet to determine a disposition strategy for these returned rods. It is something we are attending to. I expect in the first week of April we will publish a series of options under consideration for intense analysis that will give us the decisional basis for action.

Mr. SPENCE. I understand all that, and I appreciate your response. I just have a little bit of difficulty understanding that proliferation question you are talking about and the relevance to the problem we have.

Do other people reprocess, recycle, in other parts of the world? Why shouldn't we be able to recycle the waste that we have that is going to be ours? How is that going to affect proliferation?

Mr. CURTIS. The reprocessing that is usually the subject of the debate as to whether to reprocess or not is a debate that occurs in the context of civilian nuclear power. And that is a debate, whether to reprocess spent fuel rods, to separate out plutonium, and then create a use of the plutonium as a fuel.

In this case, we are talking about a different animal. Here we are talking about highly enriched uranium in test reactors. We are not really contemplating reprocessing, nor are other nations of the world, reprocessing of the highly enriched uranium. We are con-

verting those test reactors to proliferation resistant low enriched uranium fuel rods.

So this is kind of an anachronism, part of the history of the development of nuclear power, that has us engaged with highly enriched uranium and spent fuel rods in university test reactors. We are pulling that out of the system.

The future will be low enriched uranium fuel rods in test reactors. It is a different issue than the reprocessing debate that we are usually engaged in.

Mr. HUNTER. I thank the chairman.

The ranking member, Mr. Dellums, is recognized.

Mr. DELLUMS. Thank you very much, Mr. Chairman.

I do have a number of questions that at some point I would like to come back to, but I want to hear from some of the more junior Members of the committee. But I do have one question I would like to raise and direct it to Mr. Curtis and ask Dr. Smith also to respond. I will go back to the question that you essentially—that you initially raised, Mr. Chairman, as someone mentioned as the fundamental question, the relationship between testing and the reliability and safety of the nuclear stockpile.

It seems to me as I listen to your question and the responses, underneath that colloquy there is a certain amount of conventional assumptions there. I would like to for a moment break out of those conventional assumptions, Mr. Curtis, and ask the question with the prefacing remark, is it not possible that at the end of the day, with the science-based stockpile stewardship program, that you could end up with even higher degree of confidence in the safety and reliability of the weapons?

My thought processes are as follows: For the last 40 years you have engaged in testing as the mechanism to establish the safety and reliability. And perhaps one could argue that doing it that same way for 40 years has not necessarily expanded the base of intellectual knowledge, awareness and understanding.

But now, because you, A, can no longer test, and B, have a science-based approach, that by your own testimony takes an enormous intellectual challenge, that in attempting to meet that extraordinary intellectual challenge, that at the end of the day you broaden the horizon of knowledge and understanding, and that perhaps at the end of that process, because you are now being challenged to think differently, to function in a different way, and you are being challenged at a higher order of magnitude than doing it essentially the same old way for 40 years, that you could end up with a higher degree of confidence rather than the assumption that underlay the initial question that said, testing is something that everybody has to eventually fall back on.

Maybe you can come out at the other end of that. Is there any efficacy to those thoughts?

Mr. CURTIS. Mr. Dellums, I think it is certainly a possibility that we can arrive at that result. It is almost a truism that this challenge will stretch and develop the core intellectual capacities of our laboratories to a higher plane than they are now on.

One aspect of the science-based stockpile stewardship program, though, is very important to the comment that you make, and that is that we need and will develop advanced surveillance capabilities

so that we can better anticipate problems before they occur, rather than having the luxury, if you will, to rely on testing of discovered problems and fixes.

I wondered if, Dr. Reis, because this is such an important part of that program and speaks so directly to your comment, might have an opportunity to amplify on that.

Mr. DELLUMS. Please.

Mr. REIS. I think Mr. Curtis said it reasonably well. I think the key——

Mr. CURTIS. Reasonably well.

Mr. REIS. I should point out that Mr. Curtis is a distinguished lawyer, and so he always pulls things together reasonably well. He is a man of reason. He is also my boss so I have to be a little careful here. I am digging myself further and further into this hole.

I think the key to making this work, Mr. Dellums, really is to not wait until the problem is on us, and that we have to go back and ask a question that Chairman Hunter asked, to try to predict ahead where we think the problems are going to be. I think that will—and fix them before they reach that—essentially before they reach the stage where you have to go back to the President and say, Mr. President, we either have to test or there is a terrible problem here.

The whole—the system we are designing, the stewardship program is designed to essentially avoid that difficult question. This is a difficult challenge, but it is not unlike the challenge that U.S. industry is facing now as they are continually concerned with understanding materials better, understanding the chemistry better, predicting ahead to make all sorts of products more reliable, more safer in terms of doing that.

A key to making that, again, if I could go back, is the initiative we are taking in computing, because we are now going to—design of nuclear weapons and all things that go with it are fundamentally a two dimensional process. Aging, cracks, changes fundamentally are three dimensional problems. They don't show up in a nice even way symmetrically around a body. They show up in different place.

We have got to be able to do those types of calculations and make those predictions early enough so we are not forced with this draconian decision of either/or. And that is fundamentally why we are—I say that is fundamental to the stockpile stewardship program itself.

Mr. DELLUMS. Thank you, sir.

Dr. Smith.

Mr. SMITH. Mr. Dellums, the stockpile today is, in my opinion, in the opinion of the departments, safe, secure and reliable. Without entering into whether our confidence could go up as a result of the challenges Dr. Reis and Mr. Curtis have mentioned, I would simply like to say that all the Department of Defense asks is that the confidence, that is, our understanding of the stockpile, remain adequate. It is so today, and with a well-funded, well-managed, science-based stockpile stewardship program, and with the direction given by the nuclear posture review, I am confident that we can maintain and adequate level of confidence.

I don't ask that it be higher. I simply ask that it be essentially the same as it is today, sir.

Mr. HUNTER. Will the gentleman yield on that question?

This is such a fundamental question.

Mr. DELLUMS. I would be happy to yield.

Mr. HUNTER. The gentleman has made a good point, and I think the depth of his question is excellent here. The problem I see is that you have two validations that have to take place.

The primary validation, of course, is the competency of the weapons themselves. But the second validation is the system that tests the weapons without testing. So how do you test the testing system, this nontesting apparatus, without a test?

Mr. REIS. I think it gets back, Mr. Hunter, to the fact that many of the components, of course, that we are dealing with, we do test. There is a lot of—and we would continue to test all the nonnuclear aspects, the fusing, the arming, all those aspects of it.

Second, as the—one is, we have a history and a database and a very full and rich database, in fact we are going to continue to plumb that database, of tests that have already taken place.

What we are interested in doing is noticing what are the changes in the stockpile, what are the things that have happened over time that are different from our database where we have had testing. And then, as we notice changes that are taking place, what is our ability to understand what they mean? Is this little bump, is that going to make a difference or not? We will be able to investigate many of those types of issues.

The key is that we will have the people available who have the judgment to be able to make that—be able to make that decision. If you look at the program that we have laid out this the science-based stockpile stewardship, for example, there is advanced hydrotasking, which uses simulation. There is advanced pulse power devices, which develop the high energy density that is needed to understand what is happening.

So if you go through the specifics of the problem that you are getting or you alluded to, we have what we feel to be a good answer that is scientifically based for each of those things which we recognize now.

We are not talking about designing wholly new, different types of weapons. We have a basis of the weapons we understand now. We have the requirements from our customer, who is, as Dr. Smith is pointing out, is getting more and more educated in terms of the depth of his understanding of what that problem is. So there are many of the type of tests we can run short of a nuclear explosion.

In the past, even when we have had nuclear explosions, we never test—you know, we never actually or rarely test, you know, the entire weapon itself. We test pieces of it. And then it is the judgment of the people as to how this whole system works. And it is based on their understanding, and it is based on the data that—the database that they are working with.

We have a full and rich database in the past. We have had over a thousand tests. We understand weapons I think reasonably well.

What we don't understand completely is what happens when those weapons age beyond their design lifetime, but we have ideas how to improve that understanding.

Those are the good questions. We think we have those answers for you.

Mr. HUNTER. I thank the gentleman for yielding.

Mr. DELLUMS. Thank you, Mr. Chairman.

I have a number of additional questions to ask at a later time. I will simply say, to follow Dr. Reis's statement, I will simply state the Chair asked the question reasonably well. This gentleman was trying to amplify it by suggesting that now that you can no longer rely on testing, the science-based approach has the potential of expanding the horizons of intellectual awareness, knowledge and understanding which may take us to a much higher place than this continued preoccupation of testing as the only way of measuring.

I thank the gentleman for his generosity.

Mr. HUNTER. I thank the gentleman.

Let me answer my colleague from California a little bit. Mike Tyson will soon be fighting in the ring again. He will expand the challenge to any of the contenders and will greatly challenge their core competencies as boxers. On the other hand, he will probably defeat them. And so I am not arguing with the enormity of the challenge. In fact, I agree it is an enormous challenge.

What I am questioning is our certainty, because we must have a certainty that this doggone thing is going to work. And so I appreciate—I think Dr. Reis's answer in some detail has given us at least part of that answer.

Mr. DELLUMS. I thank the gentleman. I will come back a little later.

Mr. HUNTER. Let me yield briefly to the gentleman from Missouri.

Mr. SKELTON. Mr. Chairman, I have a question I would like to put to the panel to be answered for the record at a later time, if I may, sir.

Is there any nonweapons research development that utilizes the same or similar scientific skills utilized for weapons development? In your personal or professional opinion, how important is it to allow our weapons scientists to work on these types of projects?

[The following information was received for the record:]

Yes. Nuclear weapons technology incorporates perhaps the richest and broadest group of physical processes that occur in a single system. The skills required in addressing these varied and complex phenomena include skills that are also applied to non-weapons R&D. A few examples are computational simulations of complex systems, electronic, high performance computing operating systems, the neutronics problems of oil well logging, super-plastic metal forming, high explosive shaped-charge development for non-nuclear munitions, industrial metal cutting, industrial demolition, and general research in astrophysics. Such research can have a synergistic and positive effect by challenging and advancing the capabilities of DOE's nuclear weapons experts.

It is critically important to scientists and engineers at the three weapons laboratories and to the Stockpile Stewardship Program to maintain an active connection to the civilian scientific, engineering, and academic communities through nonweapons R&D to keep abreast of relevant technological ad scientific advances and to integrate commercial technology and supply bases into direct weapon activities. Involvement in nonweapons R&D also allows retention and attraction of a broader pool of talent than otherwise would be the case.

It is important to note, however, that although interaction between industry and universities and the weapons experts will improve efficiency and effectiveness, this interaction alone is not sufficient to maintain the necessary core nuclear weapons competencies due to the unique nature of many aspects of nuclear weapon's design, engineering, and production.

I would appreciate your discussing this in terms of retaining and attracting critical personnel for today and for the future.

Thank you.

Mr. HUNTER. I thank the gentleman. I assume that is a question for the record.

[The following information was received for the record:]

NONWEAPONS RESEARCH AND DEVELOPMENT

As a matter of longstanding policy, the Department of Defense considers this area to be under the purview of the Department of Energy. Therefore, DoD defers to DOE on this issue.

Mr. HUNTER. Mr. Thornberry of Texas is recognized.

Mr. THORNBERRY. Thank you, Mr. Chairman.

With regard to the discussion of my more senior colleagues, it seems to me one could argue we could have both, and that is, expand our procedures and so forth, and maybe have testing to make sure that it really does work right. That is just a comment, and we can get back to that later.

I want to focus on a couple of other things. I was very struck by the comment of Dr. Smith that we knew have the oldest stockpile that we have ever had. I presume that we have never built nuclear warheads to last forever. And at some point we are going to have to either rebuild or build new ones.

Is that the case, Dr. Reis? If so, when are we going to need to start building again?

Mr. REIS. I believe that is the case, Mr. Thornberry. I think the current—the design life of the weapons, many of the weapons we have now which were started in the 1970's and 1980's will start sometime around 2005 offer so. You will see weapons reaching their, you know, their expected design life. At that time, one would have to start replacing just the way you would, you know, an engine in your car, start doing rebuilds on some of the components in those weapons, to expect them to last any longer.

Mr. THORNBERRY. Mr. Curtis, let me ask, does the department agree with the conclusion of the Galvin report this that, "Future production should be based on the residual capabilities of Pantex, Los Alamos and Sandia National Laboratory and no other investments in production capabilities are needed at this time"?

Mr. CURTIS. We certainly believe that no other investment in production capabilities are required at this time. We have yet to evolve the production strategy that Dr. Reis referred to, and that will be an element of the fully developed stockpile stewardship plan. And we will certainly take into consideration the Galvin task force judgment at that time.

Mr. THORNBERRY. And when can we expect that?

Mr. CURTIS. We hope to evolve this with the Department of Defense.

Let me emphasize, this is not just the Department of Energy's adventure here; that this is a plan that we will develop with our partner in the Department of Defense, and which will meet both our requirements and our customers' confident assurance that it meets their requirements.

But we hope to do that within this calendar year.

Mr. THORNBERRY. Let me ask a couple of questions related to plutonium that we are taking out of nuclear weapons that have been dismantled. As you well know, of course, they are being stored on an interim basis at the Pantex plant in my district.

Can you tell me how long interim storage is and when other options other than interim storage will be presented to the Congress for us to consider?

Mr. CURTIS. As you know, we are doing a site-wide environmental impact statement at the Pantex facility that will evaluate the storage options that would include some definition of—some temporal definition of time that pits would be stored at the Pantex facility.

At present we have a self-imposed constraint to store no more than, I believe the number is 12,000 pits at Pantex until we have concluded and acted on and the Congress has had a chance to consider the longer-term storage options.

Mr. THORNBERRY. And when will we have those options available to us?

Mr. CURTIS. I do not have in my head what the time frame is.

The site-wide will be completed with a record of decision, I am told, by November 1996.

Mr. THORNBERRY. Well, I share the Chairman's concerns about looking ahead, not just in the limited area that you all were discussing, but in the broader area of these materials and what we are going to do with them. And certainly I don't believe that it is in the best interests of anybody to just leave it in a certain situation and not ever be able to do anything with it. And I know that you all share that.

Let me ask one other question. My understanding is that the $70 million request in the DOE budget for the fissile materials control and disposition includes $10 million fortunate resource center for plutonium. Is that correct? Do you believe that that resource center can play a useful role in examining some of the issues associated with plutonium and what we do with it?

Mr. CURTIS. We do. As you know, that resource center is to be supported by a consortium of university assets, and we believe that those assets can make a significant contribution to our understanding, and also to the public policy development that needs to occur here.

What we in this area, as in so many, have to fundamentally develop is a sustainable political consensus as to what to do with these materials that will carry from one Congress to the next, and that the people will have continual confidence in. This resource center can contribute greatly to that task, to developing an understanding of plutonium disposition options that the public can accept, that will be the underpinning of the political consensus we require.

Mr. THORNBERRY. Thank you, sir.

Mr. Chairman, I also have several questions I would like to submit in writing for the record and ask this panel to answer for the record.

Mr. HUNTER. Without objection, we will allow the gentleman's questions to be asked and answered for the record.

[The following information was received for the record:]

QUESTIONS FROM REPRESENTATIVE THORNBERRY

I understand that the Nevada Test Site (NTS) is required to maintain its readiness to test nuclear weapons upon a Presidential decision to do so. In order to maintain this level of readiness, a cadre of skilled and experienced workers are needed on the site. One of the key specialties required for nuclear testing is specialized drilling. Today the cadre of NTS miners and drillers is being kept intact because the Civilian Radioactive Waste Management Program is using some of its talents in related work. However, I understand that the DOE plans to remove the Yucca Mountain mining and drilling work from the NTS scope of work this coming fall, along with some Yucca Mountain environmental monitoring work, some architectural/engineering work, and some associated administrative support. Some experts have argued that the loss of such work at the NTS would be devastating to our national defense posture. It could possibly result in a complete loss of the drilling expertise that is absolutely essential for any future nuclear testing. Because there are no other similar job possibilities in Nevada, that capability will be dispersed nationwide and would therefore be unavailable to implement the national policy of maintaining test readiness.

Question Is the DOE planning to remove the above Yucca Mountain functions from the NTS? Why or why not?

Answer: In the past, the DOE's Office of Civilian Radioactive Waste Management (OCRWM) funded several of the Nevada Test Site (NTS) contractors to provide drilling, design, environmental and other services required to support the site characterization efforts at the Yucca Mountain site. Over the last four years, design activities for the Yucca Mountain Site Characterization Project (YMP) have been transitioned from the NTS contractors to the OCRWM Management and Operating (M&O) contractor. With the reduction in NTS program funding, many of the former NTS contractor design engineers are now part of the OCRWM M&O contractor.

OCRWM has directed its M&O contractor to consolidate the YMP contractors under one organization to improve management control and cost efficiency. The NTS contractors providing mining, drilling and environmental support to the YMP will now be under OCRWM M&O. This keeps the valued NTS experience in Nevada.

OCRWM continues to obtain many other support services from the NTS contractors including housing, feeding, custodial and bus services; operation and maintenance of facilities, utilities, communication and alarm systems; emergency medical and fire protection services; occupational health and radiological safety services; and badging and security services.

QUESTION FROM REPRESENTATIVE THORNBERRY

Nevada Test Site

Question If DOE is planning to remove the above described Yucca Mountain functions from the Nevada Test Site, do you think the Nevada Test Site will be able to maintain its readiness to test nuclear weapons? Why or why not?

Answer: The Yucca Mountain Site Characterization Office (YMSCO) has utilized some of the same resources which are required to conduct underground nuclear testing. These resources were mostly in the area of drilling, mining and heavy equipment operation and maintenance. However, the specific work performed for YMSCO differs from that performed for the testing program, as do the requirements and regulations under which the work is accomplished.

Presidential guidance regarding the nuclear weapons Stockpile Stewardship Program provides that the Department of Energy (DOE) will maintain the capability to resume underground nuclear weapons testing within two to three years of notification beginning in FY 1996.

DOE will maintain core knowledge and capabilities necessary to support this test readiness posture through experimental activities performed in conjunction with DOE Laboratories and other Test Site users.

QUESTION FROM REPRESENTATIVE THORNBERRY

Nevada Test Site

Question Do you agree that the planned removal could have the adverse consequences described in the above background paragraph. Why or why not?

Answer: As noted in the response above, the YMSCO requirements are different than those for underground nuclear testing. The core knowledge and capabilities for underground testing will be maintained through experimental activities performed in conjunction with DOE Laboratories and other Test Site users, and the necessary full level of skills and capabilities would be reconstituted within the Presidentially-mandated three year period should the President direct DOE to resume testing. While it is anticipated that there will be a minimum of programmatic impact to the test readiness mission as a result of YMSCO not utilizing the DOE/NV M&O contractor, some cost impact to the stockpile stewardship program will be experienced as a result of reallocation of overhead cost.

Mr. HUNTER. Mr. Curtis, did you have an additional statement?

Mr. CURTIS. Mr. Chairman, the reason I looked up, I wondered if this is a convenient—I am a little troubled about my response to Chairman Spence with respect to making sure I understood his question, because I was understanding his question to address reprocessing in the sense of recycling these highly enriched uranium base spent fuel rods.

But reprocessing understood as processing is a disposition strategy for these rods, and that processing of the rods, namely to separate out the fissile material from the waste, is a disposition strategy that will be examined in the disposition strategies of the draft EIS.

So I didn't want to imply that it is unrelated to the disposition strategies. But I understood it in the terms of recycling. We are not recycling this material into new test reactor fuel rods. And I hope that is clear. I will be happy to amplify on the record. Thank you.

[The following information was received for the record:]

The Department is evaluating a range of alternatives for managing foreign research reactor spent fuel rods in the Draft Environmental Impact Statement (EIS) on a Proposed Nuclear Weapons Nonproliferation Policy Concerning Foreign Research Reactor Spent Nuclear Fuel.

This program is a vital element of U.S. nonproliferation policy to discourage international commerce in weapons usable nuclear materials. In this program, the U.S. seeks the return of spent fuel rods containing weapons usable highly enriched uranium, which was initially enriched in the U.S. and shipped overseas. It is part of a larger effort to encourage the use of low enriched uranium in research and test reactors rather than weapons usable material. Among the range of reasonable alternatives that are considered in the EIS are a number of processing alternatives. These range from traditional aqueous-based PUREX reprocessing to an effort to develop a new technology and construction of a new facility to process the spent fuel in a way that maximizes safety, minimizes waste production and minimizes cost. This new technology would not necessarily seek to separate fissile material as traditional reprocessing technologies. The EIS also considers alternatives that includes processing the spent fuel in other countries, such as the Dounreay facility in Scotland.

In any of these alternatives, processing is considered as a method for separating the highly enriched uranium from the waste products and structural materials and is being considered as a potential waste management tool. After separation of the highly enriched uranium from the spent fuel, it would be blended down to low enrichment so it could not be used in weapons. In the past "reprocessing" was performed to extract plutonium and highly enriched uranium for nuclear weapons production. The highly enriched uranium was used indirectly as driver fuel rods in production reactors for producing plutonium and tritium. Reprocessing, as defined here, is not being examined as a disposition strategy in the draft Environmental Impact Statement; but is examined as a technique for converting HEU to LEU. It must be emphasized that no decision has been made on a U.S. policy for disposition of the foreign research reactor spent nuclear fuel and will not be made until after completion of the Final Environmental Impact Statement.

Mr. HUNTER. I thank the gentleman.

Mr. Evans.

Mr. EVANS. Thank you, Mr. Chairman. I am concerned about recent moves to abolish the Department of Energy and transfer its weapons functions to the Department of Defense. This has been studied before. In 1985, a blue ribbon Presidential task force which included the President, Secretary of Defense William Perry, advised against it, citing the need to maintain independent judgment on nuclear safety and security matters.

We have to ask if the DOD has the kind of expertise in weapons production to ensure health and safety for the work force of the

complex for the communities that surround the complex, and of course for our environment as well. I think the answer is a flat no.

While DOE's past record of management may not be totally unblemished, it has experienced an institutional memory that cannot be replicated anywhere else.

So, Mr. Curtis, I would like to ask you your views on abolishing the department and shifting its functions to the Department of Defense. Would you please tell us if in your opinion this would be effective other save any money.

Mr. CURTIS. I thank you, Mr. Evans. I have tried to address this in the statement.

I think the fundamental question is, can you better assure the safety, reliability, and performance of the stockpile if this transfer were to occur. It is my judgment that you cannot.

It is my judgment that we have always been dependent upon our laboratories to carry out this stewardship responsibility. In an anticipated environment in which this responsibility is to be carried out in the absence of both production and testing, we are dependent now more than ever, if I may use an old political phrase, on our laboratories.

We believe that if you were to transfer this function to the Department of Defense, the laboratories will become suboptimalized to a more narrow defense mission. They must be able to attract, strengthen, and freshen the core capabilities that we will depend upon in the future, challenging future, to support this stockpile.

So from a mission standpoint, we think it is a bad idea. It will not help us accomplish the mission. We don't see any savings whatsoever associated with it. From a policy standpoint, we also believe it is not a good idea. This is a long—some 40-year history in which this Nation has maintained a separation between the customer of the weapons, the Department of Defense, and the supplier of the weapons, first throughout Atomic Energy Commission, then the Energy Research and Development Administration, and only lastly in the Department of Energy.

As you suggest, study after study has confirmed that the tension and balance achieved by this bipolar responsibility has served the Nation well. We believe it continues to do so.

We think it is very important that an agency other than the Department of Defense, with assured technical competence, has a place at the table at which important issues with respect to the stewardship of this very significant weapons system are decided in the international—in the interagency process.

All of those arguments I would suggest should caution this committee, this Congress, against taking that step.

Mr. EVANS. Thank you.

I would like another question directed at the panel. If START II is ratified and we negotiate even deeper reductions in our warhead levels in a START III or other agreement, what impact will this have on our tritium requirements?

Mr. REIS. Of course the tritium requirements is directly related to the number of weapons that you have. And so if the numbers go up, you need more tritium. If the numbers go down, will you need less tritium. Simple as that. Given that the time we would

need a new tritium source to be producing more tritium, then it would shift out, of course, in time.

Of course, tritium, you will still need it, because all the weapons in our enduring stockpile have tritium, and tritium decays. You lose 5 percent of the tritium every year. So we change quantitatively the tritium story, but qualitatively it wouldn't change.

Mr. EVANS. Thank you, Mr. Chairman.

Mr. HUNTER. The gentleman from Missouri, Mr. Talent.

Mr. TALENT. I thank the Chairman.

I thank the witnesses for their very enlightening testimony. I am new to this subcommittee and to this issue. So I have got a question, maybe it is an over simplistic question, but I would like to direct it to Dr. Smith and Dr. Reis.

You are the experts. In your judgment, in your best judgment, is the nuclear stockpile as reliable as it was, say, 2 years ago?

Mr. SMITH. Sir, I have no difficulty answering that question. I have been in office now for about 22 months. I have had this responsibility for that period of time. One of the first things that I did upon taking office was to address just the question you are raising. And of course since that time I continue to make sure that I am satisfied.

The simple answer, sir, is, yes, the stockpile is as safe and reliable today as it was when I took office.

Mr. REIS. I would concur with that.

Mr. TALENT. One of the reasons I ask this, and I understand that you are scientists and this is to some extent an uncertain subject and you have to answer in that vein, we talked before about the importance of maintaining an adequacy of reliability. Adequacy is not a term in my understanding that has been used in this context of this issue very often.

These are nuclear weapons. We want 100 percent reliable. We don't want adequate as opposed to—I want above adequate. So when you are saying adequate, you meant 100 percent reliable? You won't accept less than that standard, will you?

Mr. SMITH. There is a small semantic problem here I would like to address very briefly, Mr. Chairman. I want to emphasize confidence is the word that we use to describe the essence of the discussions that have taken place this morning.

Confidence is directly related to how well do we understand the weapons that are in the stockpile. It is mathematically impossible to be 100 percent confident that we understand all aspects of the weapons. It just cannot be—there is no amount of money and there is no Department of Energy that could do that.

So that by use of the term adequate, I think should make you feel comfortable. We cannot have 100 percent, but can we be adequately confident, as you heard before, I think we can, sir.

Mr. TALENT. When you say adequate—and this does clear it up for the record—when you say adequate you mean you are as certain as the nature of the subject permits you to be, and that was not—the standard for adequacy is not something in your mind that has changed in the last year or 2 years?

Mr. SMITH. That is true. I am not in any way trying to be clever here.

Mr. TALENT. Oh, I understand that. I am trying to understand.

Mr. SMITH. I appreciate that. When I said our confidence in the stockpile was adequate, another way to put it would be that the Chairman of the Joint Chiefs of Staff is satisfied with the reliability, performance, confidence, that we have in the stockpile.

Mr. TALENT. Have any of your top technical people expressed concerns to you personally or in memos or anything like that saying, Look, we have doubts that it is as reliable as it was a couple of years ago?

Is that something that gets raised intraagency and that you have had to address? If it has been, how have you responded, what were those concerns?

Mr. SMITH. That is a good question, sir. It is my responsibility to have my office be absolutely open to concerns of that nature, and we have been. And the question I think you would like me to address is, are the experts coming to me and noting their concerns that the stockpile is not as reliable as in the past, or our confidence is not as high as it has been in the past. And I can answer with absolute assurance that no such questions have been brought to my attention.

Furthermore, I make a point personally of visiting the laboratories and other installations of the Department of Energy and seek out those people that might ask such questions. And I don't mean to say that I can sample that very large ensemble of people with any thoroughness, but I have talked with the leaders and the respected scientists and engineers, and again, the answer is the same.

Mr. TALENT. I appreciate those comments and that attitude and I would congratulate you on it. I think what we up here need is a comfort level. Just listening to this, I think everyone was into the technicalities that we didn't have that comfort level.

Mr. REIS. I would only add to that that we have had in the past and continue to have a really vigorous surveillance program. We are looking at these weapons and testing them, not in terms of all the components, all the time, and that is a continuous process, and we are working with the Department of Defense, Dr. Smith's office. This is a team effort.

What the concern is, of course, is projecting that out into the future. And as I mentioned to the chairman earlier, that was the reason we feel we can project out in the future ask we are dealing from a very powerful understanding right now, very powerful team, a very strong process that has worked literally over 50 years, and we are not abandoning that in any way. We are using that, if you will, as the base of what we are doing.

Mr. TALENT. One other question, and then I am finished, Mr. Chairman.

On this whole question of whether DOE should do this or DOD should do this, are you two satisfied that culturally in your agencies the mindset regarding the attitude regarding the level of certainty—is DOD more concerned about this than DOE is? Do you sense the culture in the two agencies in the way they approach this question is different? Is that a concern you all have? It would certainly bear on the question of who ought to have responsibility for it.

Mr. SMITH. Dr. Reis and I have been working together, both as government employees and before that. To the best of my knowledge——

Mr. TALENT. Do you all play poker together?

Mr. SMITH. I would not draw an inside straight. Vic might, but I won't.

Mr. TALENT. It is a little scary when we find out the man in charge of the reliability of the nuclear stockpile draws the inside straight. It depends on the odds, I guess.

Mr. SMITH. Second——

Mr. HUNTER. I think that qualifies him for this program.

Mr. SMITH. I think you are asking what is the Department of Defense's view on the possible transfer of the defense programs to DOD. We are very clear on that issue. Dr. Perry, Dr. Deutch, and myself have all commented publicly that we do not want this responsibility transferred to the Department of Defense.

Mr. REIS. I think the question you asked in terms of what is the culture, how does that grab, I think that is a very important question. It goes to the heart of it. In the past, indeed, it has been particularly in terms of safety concerns, those safety concerns have inevitably been pushed by the experts within the Department of Energy. They are the ones who are closely related, more closely related intimately, we are the suppliers, they are the customers, they have a lot of other things to do. This is our fundamental, our main job.

So, if anything, the culture particularly related to safety, again, this is not a—this might be a 51 percent—49 percent suggestion is that frequently the concerns have been raised by the people within the Department of Energy laboratories, because they know that is their primary—you know, their primary concern. And I think that would project itself into the future.

Mr. TALENT. Thank you, Mr. Chairman.

Mr. CURTIS. Mr. Chairman, may I make a point on that if I can?

Mr. Talent, I think that your last question really brings out the benefit of maintaining what the congressionally mandated 1990 nuclear weapons safety study found, and that is there is a benefit in the tension and balance between the two departments, and to the extent that there are cultural differences that challenge the stretch to establishing a science-based stockpile stewardship, I would suggest that the two agency context creates greater assurance that this stockpile stewardship program will meet the test of confidence that the Congress is searching for and that this committee is searching for, namely, you can compromise differences once you get in a single agency context, and they would not be transparent to the Congress or to the process.

So I think that is a very important point to bring out.

Mr. TALENT. I certainly agree the dynamic can work that way. I guess my concern was, is either of the agencies biased for or against a particular procedure?

Is DOE, for example, more biased against actual testing, whereas DOD says, look, all we care about is that these things be reliable, and if that is the best way of accomplishing it, we want to accomplish it that way, and if there are biases in one direction or another, it would certainly bear on the issue.

Mr. CURTIS. Sure. I think that is a good point.

Mr. HUNTER. I thank the gentleman.

Dr. Smith, when you answered the gentleman's question, and you spoke about confidence rather than a numerical or statistical reliability as being the standard in this area, I thought that was an important answer. And in reflecting on that, there is really three species of confidence the, No. 1, U.S. confidence, our own confidence in that stockpile. No. 2, the confidence of our allies. And lastly, maybe most important, the confidence of our adversaries.

So let me put the question to you using your own term. Are you certain, are you certain that stockpile stewardship will result in the same level of confidence in the stockpile capability that we presently have?

Mr. SMITH. Mr. Chairman, I thought you were going to ask me about the confidence that our adversaries would have.

Mr. HUNTER. That ain't it.

Mr. SMITH. Then you have asked me if I think the confidence will remain the same.

Mr. HUNTER. No, not what you think. I am asking you, are you certain that this program, and Dr. Reis described it as an enormous challenge, will result in the same level of confidence in the stockpile capability that we presently have?

Mr. SMITH. The answer there is straightforward, Mr. Chairman, that as an engineer as a scientist, that without testing, it is quite likely that the confidence that we have in the stockpile will go down. That is why I have been so careful to use the word adequate.

Will it go down to a level that is not adequate? I think not. But it would be impossible for a scientist to say that we can maintain the same level of confidence without testing—with testing as we could without. But I can say, again, as an engineer and a scientist, that we can maintain an adequate level of confidence.

I hope I have been responsive to your question, sir.

Mr. HUNTER. That was a good response. I appreciate that.

Let me ask another question that Mr. Baker had raised. You showed us, you are working on safeguards against hemorrhage of Russian materials. It looks like at least your pictures appear to show that you are doing a pretty good job in some areas that are critical, and we all know this committee has been briefed a number of times, and it has been openly in publication that is there are a number of institutions in the Soviet Union that have heretofore been pretty open, where literally we were afraid that people would walk out with pocketfuls of material. There has been some apprehensions in the press that have validated that concern.

Now, you folks are working on that security issue. DOD is working on that security issue under Nunn-Lugar and a number of members of this committee have talked about, Hey, let's, along with the trucks, the transport and the shields and the other things, have guards, dogs, and scanners, for example, in some areas where you can't walk out with material without something beeping.

My question for you, and maybe Dr. Smith can answer this with you on this, is, who is in charge here? Is there integration of the DOE and DOD programs for security of the nuclear apparatus in the Soviet Union? Are you guys communicating? Are you working together? What is going on?

Mr. BAKER. The answer, sir, is, yes, sir, we are working together. In 1996, as far as material protection and control and accountability, we, DOE, are in charge. We have taken this from the Defense Department, no longer are they working on any of this. We have the sole responsibility for this.

What we have done is that we have gone to the intelligence community and we have—they have outlined to us, and I can provide the document to the committee, it is a classified document, on the facilities in Russia that are at the highest risk that they say that nuclear material can escape from these facilities.

Our plan is to fix all of these facilities, No. 1, to work with the Russians, which we are doing right now, to transfer technology which they can use, just like I showed you at Kurchatov, and then turn this over to encourage an indigenous Russian program that they will do this on their own in the future.

By doing this, by these x number of facilities, which is a classified document, we will be able to control almost 100 percent of the plutonium and about one-half of the highly enriched uranium that are not in the ministry of defense weapons systems.

Mr. HUNTER. Let me just ask you a fast follow-up. The situation is one—it is an immediate situation. It is an exigency, it is an emergency, and we have all heard horror stories of people walking right in, you see these guys driving around in new BMW's and you come to the conclusion that some stuff may have moved.

There are some basic things we could do very quickly, just like a company would do in the United States, if they thought stuff was going out the door with the employees, boy, they would have scanners in there post haste.

From we done the basics there in terms of getting some scanners over immediately, putting that stuff in place, and just getting the basics so that stuff can't wander out the door tomorrow?

Mr. BAKER. We are doing our best to do that right now.

Mr. HUNTER. Well, what do you mean by that?

Mr. BAKER. We have got two types of agreements right now, one which is called a government-to-government agreement, which is working with the Ministry of Atomic Energy, and that is a little tougher to work the bureaucratics of that side. The other one is a lab-to-lab agreement, which Kurchatov is, which is working the institutes, the labs, like Sandia and Livermore, working in private labs. We are working that immediately.

As a matter of fact, in the next year, if you will approve our budget, we will have six facilities right now that they have agreed to on the lab to lab, and six facilities also on the government to government that we will have hopefully fixed in the next year. So we are working this as quickly as we can within the bureaucracies that you have to work within government.

Mr. Curtis may want to add to that. But that is our plan right now. And again, can you see how quickly we are doing this, and we are doing it very quickly.

Mr. HUNTER. Let me just say that to us, this is an emergency of the upmost character.

Mr. BAKER. We agree with you.

Mr. HUNTER. How much do these scanners cost? When you slap these scanners if these entrances and exits so people go out and they buzz if they have got stuff on them.

Mr. BAKER. I don't have the figure at the top of my head.

Mr. HUNTER. They are probably not very expensive.

Mr. BAKER. They are not very expensive.

Mr. HUNTER. In government we all labor under this thing that sometimes we don't do anything until we can do everything, until the big program is in place, and because of that we are often caught doing nothing.

Couldn't you embark on a crash program to just get some scanners? Is Nunn-Lugar money being used in this to move equipment?

Mr. BAKER. Nunn-Lugar money right now is not being used. There was a reprogramming action underway to get $15 million in fiscal year 1995 to do this. But Nunn-Lugar money right now is not being used.

Mr. CURTIS. If I may amplify, Mr. Chairman, Ken is referring to a new implement program on lab-to-lab collaboration that we are funding in fiscal year 1995 at $15 million. Nunn-Lugar money has been engaged in material control and accounting in the former Soviet states. The transfer that is anticipateed in 1996 is the understanding that, first of all, much of the risk we are attending to is a risk occurring on the civilian side of the Russian Government, not in the Ministry of Defense.

No. 2, that the capability to give effect to material control and accountability measures is resident in the Department of Energy's laboratories. So it is the sensible match-up with the responsibility with capability to see if we can make progress.

What is pacing this program is gaining the necessary trust and permission from the Russian Government to proceed. We have actually made some very significant progress in that just this last calendar year. And so we are encouraged to believe that we will make meaningful progress.

What you see in fiscal year 1996 is a budget that we believe is as much money as we can usefully apply at this present moment. That has been worked out by a consortium of our laboratories, headed by Los Alamos, you will talk to Sig Hecker later in the morning, with the Department of Energy to try to size our budget for capacity to action.

Mr. HUNTER. All I am saying, Mr. Curtis, what you showed in these pictures, making people buzz when they walk out the door with the tools, is something that a hardware store could put in in a couple of days, and would if they were losing money.

In the context of this international emergency, that is, these dangerous materials possibly exiting, I guess what I am asking you is, why can't we make an inventory with the Soviets of the number of locations where we would like to put some real basic fairly cheap stuff and immediately, I am talking about within a few weeks, give it to them?

Now, I think, while a more complex program may require more coordination, if you gave them a scanner in a particular laboratory, wouldn't they probably use it? If you said, you have got an exit, an entrance, we are going to give you two.

Mr. CURTIS. I think our highest priority is to get portal and perimeter monitors in place. We have offered those. We have excess in our inventory. We have offered those to the Russian Federation and to the institutes. And we are not just trying to do a full, complete system at each of the facilities.

Mr. HUNTER. Are you asking them on a regular basis, can you take these scanners? I think we ought to get these things in as fast as possible.

Mr. CURTIS. There is a very serious engagement of Menatim on this. Ambassador Goodley has been leading this for our government. I did not want to step in the way of Dr. Smith, who really has the responsibility and is the official voice on Nunn-Lugar. And he should comment on this.

Mr. SMITH. I am pleased to do so, Mr. Chairman. First of all, the question as to whether or not aid to the Menatim side of Russia is coordinated, it most certainly is. Early on, the money, while still part of the CTR program, was under the managerial direction of DOE. We refer to this as MC&A, material, control and accounting, and that was some $30 million.

Ten was transferred immediately—10 was immediately put under DOE management. And we are ready to put the remaining money under them. We have also transferred funds in fiscal year 1995 to the Department of Energy, and we will make a similar transfer in fiscal year 1996 from the top of the line of both departments.

Mr. HUNTER. Let me ask you just a basic kind of common-sense question. I will go to the ranking member of the full committee, the gentleman from California.

Do you have people you can talk to on a one-to-one basis, where you can pick up the phone or get a communication to the effect that, here we have got some equipment we would like to get to you right away, if we got it to you, would you put it in right away, or do you have a very—very much of a bureaucratized relationship with your Soviet counterparts that means these things move in terms of 6-month periods and years instead of weeks?

Mr. SMITH. No, sir. As a former businessman, I would not tolerate that kind of bureaucratic impudence. I personally do not hesitate to deal directly with the various ministers.

As a good example, the leader of the Nunn-Lugar program reports to me, Major General Rogalajoy, is in Moscow today, and I talked to him first thing this morning. He is engaged directly with General Lagarov, who is Mr. Nagirov's number two man. He and the general are in discussions today on how we can quickly release equipment that is needed to build the storage facilities where ultimately the weapon components would be stored under conditions that would allow us to mutually inspect those.

But the simple answer to your question, sir, are we—do we have a number of lines of communication that give us direct access to our various counterparts in Russia, and the answer is yes.

Mr. HUNTER. But that is not the totality of my question. My question is, do you have people you can work with to get American equipment in place quickly?

In other words, it is disturbing to me that these real basic things in an American company would put in literally within 24 hours if

it had stuff going out the door with employees is something that we are talking about in terms of years, installing them in the Soviet Union. That indicates to me we don't have the type of working relationship that we would like to have.

I guess what I would like to ask you, Dr. Smith, for the subcommittee to provide, if you could, is in a classified form if that is necessary, an inventory of places where you have stuff that could walk out the door, and a simple description of whether or not we have scanners at those places, a modicum of security equipment. What it is and what the prospects are forgeting it at all those places.

When you get them at all those places, we will be happy.

Mr. SMITH. I will be perfectly happy to take that for the record. I would request that the Department of Energy join us in that response.

Mr. HUNTER. We want to get that stuff in place immediately, and just do some real basic security here. And then let's go on to these programs of sharing technology and the things that take years.

Mr. SMITH. Let me take a moment, if I may, Mr. Chairman, to distinguish clearly the responsibilities between Defense and Energy here. Where the weapons themselves are involved, we, the Department of Defense, work directly with the Ministry of Defense. That is proceeding very smoothly.

General Mazlin, who is my counterpart in Russia, will be visiting here in the first week of May. It is my hope that you yourself, Mr. Chairman, will have the pleasure of meeting with him and you can direct very penetrating questions to him and make your own judgments.

With regard to the weapons, as they are dismantled and as those components proceed down what we will call the chain of custody, we think we are doing extremely well. As Mr. Curtis pointed out, it is on the civilian side where our concerns are amplified. It is the Kurchatov Institute that Mr. Baker referred to.

There we in the Department of Defense understand that the expertise rests in DOE, and it is for that reason that we have transferred funds from Nunn-Lugar and have encouraged our colleagues to seek additional funding from the Congress to worry about the special nuclear material, the highly enriched uranium, plutonium, et cetera.

It is those institutes that I think you really want to have addressed in your question for the record. And we will turn expeditiously to that.

Mr. HUNTER. Thank you.

Mr. BAKER. Another thing, Mr. Chairman, if I may, as you may remember, in February's Washington Post, February 24, the title of the article was "Russia Offers tighter Security to Protect Nuclear Materials." The prime minister finally got his attention in Russia that there is a problem and they are taking action.

So we are accomplish in the indigenous Russian program to do this. So it is working.

Mr. HUNTER. Let me tell you what we are going to do. I want to have a little map with a bunch of locations on it where there is material that could walk out the door. And every time you folks get scanners, the basic equipment for security in one of those

places, we will put a star next to that dot. I will be happy when a star is next to every dot.

Of course the committee encourages very strongly this cooperation between DOD and DOE. And I might say as a person who has had a lot of questions about Nunn-Lugar, that is one way I think to get members on board who have been suspicious of the efficiency of Nunn-Lugar expenditures, if you guys are working closely together.

Let me thank Mr. Dellums for his patience and yield to him.

Mr. DELLUMS. No problem, Mr. Chairman.

Let me just go back to your colloquy with Dr. Smith, because I know of your great interest in the issue of testing, and make this observation to you.

It would seem to me as a nonscientist that the only way you could have 100-percent confidence is to test every weapon, which would take this whole thing to absurdity. Therefore, when you are testing, you are only testing one weapon, and all you really know is about that weapon. And from that point you are extrapolating. So you are already buying into a model of extrapolation.

What I am simply saying is that if you buy into that on the testing side of it, on the science-based side of it, you can buy into the same program of extrapolation. You are never going to—Dr. Smith pointed out, mathematically ever get to the issue of 100-percent reliability.

So this preoccupation with testing, you can set it down, because it doesn't really do what it seems to me your questions contemplate that it does, and that is to seek 100 percent, because I know no rational human being wants to fire every weapon in the arsenal to say, Aha, 100-percent accuracy.

Mr. HUNTER. Will my friend yield?

Mr. DELLUMS. Of course. So you only know about the one you are firing. From that point it takes scientific and intellectual extrapolation to say, yes, I have confidentiality level that the rest of the arsenal is safe and reliable, et cetera, et cetera, et cetera.

So when you lay that down, when you move to science-based, it seems to me you are simply embracing a different approach to extrapolation on the whole deal. And what my hope is that will allow us to lay down this preoccupation with testing, which raises a number of other enormous implications.

Mr. HUNTER. If my friend will yield.

Mr. DELLUMS. I would be happy to.

Mr. HUNTER. The reason for precisely what you just said is—the reason I rephrased in my question to Dr. Smith, which wasn't a 100 percent question. It was that all you can achieve is a modicum of confidence.

So my question was, are you certain that under this new program we will have the same level of confidence that we heretofore have enjoyed under a testing regimen. And so he answered to that question, no. So my question wasn't, do we have 100 percent now and can we maintain it. It was, we have a certain level of confidence, and can we maintain that same level.

Mr. DELLUMS. I am not sure he actually said no. There were some qualifications in that answer. But I will accept your——

Mr. HUNTER. If Dr. Smith, if you want to—we have now had a little back and forth here. If you want to enter in, we would like to hear your clarification, if there are any.

Mr. SMITH. Mr. Chairman, when I was preparing for the doctoral exam, my fellow students encouraged me to get the Members of the faculty to argue between themselves. I think I have succeeded.

You are quite right, Mr. Chairman, I did say, as an engineer and scientist, that the confidence in the stockpile without testing will have to go down. But, as Mr. Dellums pointed out, I quickly added, the question is not will it go down.

The question is, will it go down to an inadequate level. I am rather confident—I am rather certain—that we can maintain an adequate level of confidence in the stockpile under the program that the Department of Energy has laid out.

Mr. DELLUMS. So we both were listening, Mr. Chairman.

Most of these questions have been answered in the course of the exchange between and among the various members. But just one question I would pose to Mr. Curtis. It deals with the question of money. There is one assumption that is not been raised here in one of the memoranda preparing for these hearings that suggests that perhaps the dollars for the stockpile stewardship program is inadequate. Therefore, I would like you to answer this question for the record.

What was the amount recommended per year in the Presidential directive establishing the science-based stockpile stewardship program, and how was this figure derived, what was its fidelity, and has it been refined.

Mr. CURTIS. Did you want that for the record, sir, or do you want this now?

Mr. DELLUMS. I would appreciate it now, if you have it.

Mr. CURTIS. I would like to answer this question in two parts. One, I would like to give an overview and ask Dr. Reis to fill in the details more authoritatively.

First, the initial Presidential directive contemplated that $1.2 billion would be required for the stewardship program. And a question has always occurred on what foundation was that figure arrived at, and then, have we fallen short of that figure in first our fiscal year 1995 budget and now fiscal year 1996.

Just let me answer it in terms of fiscal year 1996. As an accounting matter, it is important to get apples and apples compared to one another. But on the basis of what was contemplated to be the constituent parts of the stewardship responsibility, we believe we have submitted a budget of $1.35 billion in those constituent parts that are rooted in the Presidential decision directive. So it is not short of that benchmark, but in fact in excess of it.

And indeed, depending on what you include in service of the science base the stockpile stewardship, it is possible for me to erect an argument that we have submitted a budget for $1.5 billion in aid of that science-based stockpile stewardship budget.

I would like to have the opportunity to submit this in detail for the budget so that you have it. But on an apples-to-apples basis, it is 1.3 and it is in excess of the 1.2 benchmark.

Mr. CURTIS. Perhaps Dr. Reis might amplify this. This is a very important understanding to get well understood, and I appreciate the question.

Mr. REIS. Would you like me to amplify a bit on how that number was achieved in the first place?

This was put together by a small but expert group two summers ago, subsequent to the President's continuation of the moratorium in terms of what would that mean. And it was a target value, and it was at a $1.2 billion—sort of by looking in the past and projecting out, what would that be in the future, the facilities that would have to come on line, what generally best judgment, you know, of a group of experts at the time.

But it was a straight profile. They said, about 1.2 over time, here are the elements of what that program would be, this is what we are trying to basically do and accomplish.

Subsequent to that, of course, we have worked over the past year during 1995, and of course we did not meet that, target, in the 1995 budget.

Again, there is some question about apples and oranges and how you do the counting. But what we have done over this past year is to begin to understand what that program is, to develop in some detail what the stockpile stewardship program is over time.

So to determine what is in it and what is not in it, how can we use some of the funds which were not initially allocated to that, if you will, in that accounting procedure, to getting the job done. So from that perspective I think we are more than—it is more than adequate in terms of meeting the goals of what that stockpile stewardship program—what the science based—if you will, where the whole idea of the science-based stewardship came from, if you will, you know, from that first group, and then the work we have done, you know, with the laboratories, with the production plants over the past year.

So we really have a much better bead on what that number is.

Mr. DELLUMS. Thank you very much. Mr. Chairman, If I have additional questions I will submit them for the record. Thank you for your generosity.

Mr. HUNTER. I thank the gentleman.

Mr. Abercrombie? I thank the gentleman.

Gentlemen, let me ask you a couple of real basics here. We started the lab system after the war, and we thought it was good to have the competition, the creativity that resulted from that competition, the second opinion, if you will, in many cases it was of national interest.

What do you envision for the future with our labs? Do you think we can get rid of one or two of them? Do you think we need to keep that same pattern that we have had historically? What do you think?

Mr. CURTIS. Mr. Chairman, may I offer a comment on that first?

Mr. HUNTER. Yes, sir.

Mr. CURTIS. As my earlier remarks indicated, we are more dependent on the competencies of these laboratories in a nontest, nonproduction environment than we have even been in the past. So we must be, first, assured that regardless of number of labora-

tories, we have the competencies to carry out our mission responsibility.

Now, we have a recommendation from the Galvin task force that relates to this question, and that would recommend that over a 5-year period, that we phase some of the weapons responsibility out of Lawrence Livermore, retaining capacities for nonproliferation association activities, but what is materially referred to is the design capability that has been the basis for this peer review to which you referred.

The essential question that we will have to address is whether we can develop substitute mechanisms to provide the peer review disciplines without having those peer review disciplines housed in independent laboratory, albeit part of the same University of California system.

We are going to address that on April 15 in response to the Galvin task force. I will of course submit that response to the record. But what will be the gatekeeper in addressing that recommendation of the Galvin task force is whether we can fulfill our stewardship responsibilities to the stockpile.

This is something we will undoubtedly entertain discussion with the Department of Defense on as well.

Mr. HUNTER. OK. Any other statements on that?

Mr. SMITH. If I may, Mr. Chairman, it is not for the Department of Defense to instruct the DOE on whether or not to have one, two, or three design laboratories. But from our point of view, because we are going to rely heavily on peer review, the concept of two different design laboratories, Los Alamos and Livermore, both competent, both fully engaged as they should be because of their stellar performance in the past in many fields of science, certainly in the areas of nuclear weapons association that we think the best situation for peer review is, as Mr. Curtis very correctly said, to maintain two independent geographically separated, culturally different design laboratories.

The decision is DOE's. But clearly our preference—I would like to set forth our preference clearly.

Mr. HUNTER. Your preference is to maintain the two laboratories?

Mr. SMITH. The ability to do two independent peer reviews, yes, sir.

Mr. HUNTER. I thank you.

Dr. Reis, we are going to have a new setup entering this new era with respect to the nuclear weapons complex. What do you see here? We are going to compactify this production base, we have got a lot of components spread out across the country. What do you see us doing here?

Mr. REIS. I think we will have to—over time, I think we really will have to make it compact, not just to save dollars, because we are all interested in doing that, but to have a system that is responsive, you know, rapidly responsive to the changes in the future.

When we are talking about a smaller stockpile, a different type of a system——

Mr. HUNTER. We are talking about a production capability.

Mr. REIS. We will be producing—by the time of the year 2000 comes along, as Mr. Thornberry pointed out, we are going to have to replace those weapons. They are not immortal. We are going to try to make them last as long as we can and we will try to understand with surveillance processes to sort of keep them going. But we will have to replace them.

We replaced—many of the components of those weapons are limited life. We replace them all the time. We discussed tritium.

Mr. HUNTER. What do you see as the complex after we have pared it down?

Mr. REIS. The specifics of the complex, there are certain things that are going to be absolutely essential. We are going to have to maintain the Nevada test site because we always need the ability to kind of respond back. We are going to have to respond to laboratories. We are going to need plants.

We are going to need, you know, plants, and the logical place to put those are where we have them, you know, where we have them now, whether we can combine them into—from two to three, you know, from, say, four to three to two, I really can't say, you know, right now.

Clearly at each of those, however, will be operated at a much more—we hope will be operated certainly in a much more efficient and appropriate manner to what we are dealing with now, because we are pulling down from a stockpile that was literally an order of magnitude larger, not just in terms of the laboratory concern, but in terms of the production complex itself. And that will be clearly a different system.

Mr. HUNTER. How about Nevada? Nevada has got, what, about 5,500 folks at it right now.

Mr. REIS. I would have to get back with you on the number.

Mr. HUNTER. I understand a number of the folks that are attached to the Nevada test site are doing work at Yucca Mountain, is that right?

Mr. REIS. My understanding is the people who are in the Nevada office are working for Yucca Mountain, and certainly maintaining the infrastructure, roads and sewers and all that of course is done centrally, that makes sense.

Mr. HUNTER. Have you examined at all the idea that we can have a smaller staff, if you will, or a complex in terms of personnel at Nevada, and if and when we need to test, keeping the capability to move in, do the work, and move out rather than maintaining the personnel at the site?

Mr. REIS. We are looking at just those sorts of options, Mr. Chairman, and of course the Department as a whole is reviewing with its strategic realignment not just the nuclear weapons complex but the entire, if you will, the entire Department.

Mr. HUNTER. If you were going to design a nuclear weapon for this changing world, it has been suggested by a number of experts that the large nuclear weapons that we had that have developed in the cold war for massive retaliation are ill-suited, if, for example, you wanted to dig out a terrorist group that exploded a nuclear weapon of their own. You might want to have a small weapon that could go deep in light of underground facilities that are being constructed in some areas.

What would you do? What do you think—what are areas generally that you think we need to pursue with respect to design of new systems, new weapons?

Mr. REIS. Mr. Chairman, the people who make that decision, of course, it is not the Department of Energy, but, you know, the Department of Defense.

Mr. HUNTER. I guess I am asking for your personal opinion.

Mr. REIS. Well, I think—let me parry that a little. I wasn't going to ask Dr. Smith to answer that, but with the nuclear posture review, one of the things that they have required from the Department of Energy is to retain the capability to design new types of weapons. I think we have that capability now and these are our requirements, and we would expect to fulfill them.

I am not going to get into the details of whether it is a weapon A or weapon B because that really is the responsibility of the Department. All I can tell you is that what they have required of us is the ability to retain that capability and, if you will, to demonstrate to them in terms of understanding that we have that capability.

Mr. SMITH. Mr. Chairman, I want to respond rather specifically to your question regarding new designs of nuclear weapons to attack buried underground presumably terrorist facilities, a very key question. The answer in any kind of useful detail is classified, and we will be happy to provide that to you.

[The following information was received for the record:]

The Department of Defense has no requirement for any new designs for nuclear warheads. There is no new design work currently being performed or contemplated in the immediate future. We have no need for new designs to target terrorist underground bunkers. However, DOD does require that DOE maintain the capability to design, fabricate, and certify new warheads and demonstrate the capability to refabricate and certify weapons in the enduring stockpile.

Mr. SMITH. The answer for that session is that we have no need for new designs at this time. That is not to say we cannot attack those targets. I am simply saying we have no need for new designs at this time.

If I may, Mr. Chairman, I wanted to go back to your earlier questions. We are encouraging our colleagues at DOE to proceed as rapidly as possible to a demonstration of refabrication capability in the small complex associated with Los Alamos, Pantex, and Albuquerque. As Mr. Skelton would say, it is a show-me situation. It is most important that we move quickly to demonstrate refabrication capability now rather than waiting until a possible deterioration takes place.

Mr. HUNTER. Thank you.

Go ahead, Mr. Curtis.

Mr. CURTIS. Mr. Chairman, you have been kind to indulge me. It is very important that the record be clear on one thing, and I am afraid it may have gotten unclear in the back and forth.

With respect to Lawrence Livermore and the Galvin task force recommendation, I should have said that the Secretary, Secretary O'Leary has already testified an initial favorable reaction to that recommendation, but the timing and details would depend upon whether and how we may assuredly carry out our stewardship responsibilities.

So what you have heard is a recommendation from the Department of Defense, a preference not to phase that responsibility out of Livermore. We have an initial favorable reaction from the Department of Energy to that recommendation, and that is the tug and pull that we will have to work out over the next couple of months.

Mr. HUNTER. OK. Thank you.

Let me ask you about—we will go back to the test readiness policy. We are proposing in the fiscal year 1996 to move to a 3-year readiness option to resume testing at Nevada, and that represents a change from current policy of retaining a capability to test within 6 months of a decision to conduct a test.

Such a change is going to save money because you are not going to need as many skilled personnel, but it also calls into question the ability to conduct a near-term test or a series of tests that might be required to diagnosis or fix a problem with weapons in the stockpile.

This goes back a little bit to the question we asked earlier about whether or not we are sure that we won't have a political override if we do need to fix something in the stockpile, and it just appears that in moving to a 3-year readiness option, we tend to be leaning or we make this decision, one I would say would be vulnerable to a political judgment or to politics.

Moving away from the ability to test rapidly, respond rapidly by moving to Nevada and making the shoot, we are now going to move to a 3 year, under the 1996 proposal, a 3-year readiness option.

Could you, Dr. Reis, Mr. Curtis, speak to that?

Mr. CURTIS. Mr. Chairman, let me attempt to answer it first. Our moving from 6-month test readiness to 3 year in the fiscal year 1996 budget is a directive to us which was developed through the interagency process. This is probably a good point to make a comment that there is an issue here that has not yet crept into this discussion that should be prominently part of the Chet's consideration.

That is the relationship of these activities and comprehensive test ban treaty to the nonproliferation treaty. We are about to convene a conference, a spring conference in April of the nonproliferation treaty to consider the question of the extension of that treaty.

As you well know, and I think this committee shares the uniform judgment since President Nixon executed that agreement, that as the world's preeminent conventional military power, we have a very strong interest in seeing to it that the nonproliferation treaty is extended, and that other nations do not acquire nuclear weapons.

Part of the deliberative process in consideration of the nonproliferation treaty is whether the signatory states, the permanent five declared weapon states, will continue progress as they are required to under that treaty to dismantlement and reduction of their dependence on nuclear weapons as a matter of international policy.

It has always historically been a tied point to the negotiation of the NTP that the weapon states work toward a process of cessation of testing.

So the reason we are stretching our core competencies to develop a proxy substitute, adequate substitute for testing, is inextricably

linked to the urgent need to extend the nonproliferation treaty to try and contain the proliferation risk of nuclear weapons.

I just hope that is well noted.

Mr. HUNTER. Was this move, this policy change requested by any of the participants in the nonproliferation treaty?

Mr. CURTIS. I don't have that——

Mr. HUNTER. Would there have been advocates of that position?

Mr. CURTIS. I don't have that information, but I think the change in test readiness that is reflected in this budget is in fact tied to steps that contemplate that we will successfully negotiate a comprehensive test ban treaty in 1996 as is contemplated in legislation and as is a very important part of our administration's policy.

Mr. HUNTER. Mr. Curtis, could you lay out for the record a description of how this was brought about in terms of our deliberations, and second, if there were advocates or those who were participating in the nonproliferation treaty, other nations which requested this position by the United States?

It is like we have done a couple of things here. We are moving in a no-test phase but we are assuring the American people that we are OK but we will always be ready to test. And now we are moving into a no-test phase where we are also decreasing our readiness to test.

Mr. CURTIS. I think I would like to recall Dr. Smith's earlier comment when we were addressing this that it is hard to imagine a circumstance that would so threaten the existing stockpile that we would have an immediate demand to test to resolve it, given the numbers of weapons systems available, the redundancy available to the situation at present.

Mr. HUNTER. But you remember, when we put together this will never happen again requirements and standards, that did include readiness to test in a short period of time, that followed the Russian breakout over 30 years ago. When they broke into a series of tests very quickly and we were ill-equipped to reciprocate. And so 3 years is a long period of time.

I would just like to know—I guess we are trying to figure out whether this is something that has real substance, whether this is necessary, whether it is a condition presaid enter to achieving this agreement, its extension, or whether it is a feel-good thing that unilaterally looks like a little money saver and it is going to—and it looks like it may advance arms control and weapons control.

So that is what we need to understand. I think if you can get for the record an in-depth description of how this came about and the advocates external to the United States and internal to our executive branch, then we will understand a little bit.

Mr. CURTIS. Let me say, Mr. Chairman, I will ask for an authoritative statement from the National Security Council to that effect. As you might well imagine, the information that you require is not resident in the department.

[The following information was received for the record:]

We have submitted a request for the information to the National Security Council staff. The information is not available at this time. We will forward the information as soon as it is available.

Mr. HUNTER. Thank you.

Just a couple of other quick ones here. Tritium, we are going to spend a lot of money with the tritium facility accelerator or reactor. We are giving in excess of $400 million in Nunn-Lugar moneys to the Soviet Union.

Dr. Smith, the possibilities in turn for that money of getting some tritium, and alternatively, buying some tritium from Canada, are those possibilities?

Mr. SMITH. Let me address the second one first, if I may. I have personally worked very hard to see if we can't buy tritium from the Canadians. Those contacts were made appropriately throughout Department of State. The answer has come back unequivocally that the Canadians are not interested in providing tritium to our weapons systems.

Mr. HUNTER. Then we will cut off their Nunn-Lugar money, right?

Mr. SMITH. I insist upon it. With regard to using Nunn-Lugar funds to in some way or other have the Russians provide us with tritium, we are not doing that. I would recommend against it.

Our main goal, overwhelming goal of Nunn-Lugar is to assist our former adversaries in dismantling their weapons of mass destruction that were formerly aimed against us that is what we do day in and day out and that is where I want it keep focused.

The bad thing or the unfortunate thing about buying tritium from the Russians is like so many commodities, it is a decaying source, so to buy tritium today does not mean we will have that much tritium later on, you know very well the decay rates, et cetera.

What we want to do as a sovereign nuclear superpower is to have the capability to supply the tritium for whatever size arsenal we decide upon and we would like that to be strictly under the sovereign control of the United States. I don't want to buy tritium elsewhere before we need it, which would be the case today, and I would much, much, much prefer to have that supply wholly within the sovereign power of the United States.

Mr. HUNTER. Thank you, Dr. Smith.

For Dr. Reis, this National Ignition Facility [NIF], you mentioned it will be an attraction, hopefully recruitment tool for talent and people. I notice that the commentary in a number of reports that have been done, part of that commentary is that we have an aging technical force, if you will, and recruitment has been difficult, and especially in the weapons areas.

So I understand NIF is going to be a tool for recruitment. But in terms of substance, could you just describe briefly what you think we gain substantively from NIF, and why it is important?

Mr. REIS. Certainly. One of the concerns one has particularly in a nontest atmosphere is to understand the weapons sophistication, while really happening in a bomb itself, particularly if we don't understand all the aspects of what is happening.

And what you get from a NIF, from a National Ignition Facility, is a much deeper understanding of the science that goes on in the fusion process, which is of course necessary in a hydrogen bomb.

You also understand a lot about the equations of state in that process. You understand about the radiator transport that occurs from the primary to, you know, to the secondary. You understand

all the science bits of understanding or many of the science pieces of understanding that Congressman Dellums talked about earlier.

I would—in the interests of time I notice that Dr. Tarter is coming on from Livermore. He could probably wax even more eloquently on it. There is no question in our mind that it really is an important aspect to the weapons physics.

I would say one more thing before I leave that subject. When one is dealing with the computer codes, we talked about that earlier, how important it is now to understand the three dimensional effects and all the things that go with that, those are very similar to the types of computer codes that will be exercised, that same level of computer understanding that you will need to do the virtual testing, if you will, the integrated testing, are the same level that one would deal with in terms of designing and building and experimenting with a national initiative facility.

Mr. HUNTER. Thank you, Dr. Reis.

Let me ask you—I know we are getting close to the end here. We are going to ask our next panel to come up after taking a break for lunch, I believe.

I will ask—if I could ask the ranking member of the full committee to be thinking about that, we will make a decision if we are going to come back after lunch or maybe drive through. I would like to have his pleasure on that.

Talking to a number of people who have talked about the prospects of making this thing work without testing, one thing that they said—one element that is absolutely critical to making it work is to have personnel who understand the forensics of nuclear weapons, basically people who take these things apart and understand what makes them work, and how well they are faring, how old they are getting and all those things.

The people I have talked to about that have expressed a concern that we don't have people who understand these forensics very well. We haven't recruited a lot of them. Do we have a good supply of these experts?

Mr. REIS. My judgment, Mr. Chairman, is, we do have a supply, but they are getting older, and they are retiring, and I believe that is why, if you will, the advance surveillance program as part of the stockpile stewardship forensics, if you will, the pathology of what is happening, not just the pathology but how to fix it, if you will, that is why it is important to get on with that and rapidly and as quickly as we can.

We don't have—we cannot stop this program and wait 10 years from now and ask do we have it. We have to move rapidly now. I think our budget request supports this.

Mr. HUNTER. OK. Just one last question. If you accept as true the idea that you have two validations that have to take place on this one, the validation of the weapon capability itself, the stockpile capability, and second, the evaluation of this stewardship program, nontesting program, wouldn't it make sense before you enter into an extended moratorium on testing where you can never validate the second requirement outside of having a nuclear exchange, to do enough tests to get into the program and do enough tests, make a couple of shoots to see if it is working, and at that point move into a moratorium?

Mr. REIS. We have done, Mr. Chairman, of course, we have done over a thousand of those tests already, and the data from those tests are not thrown away. I mean, we have that. We have many of the people who have worked on those tests and understand that.

The question is, can I join that, can I conjoin that now. And I think the answer, our program, you know, takes that directly into consideration.

So we are not abandoning—we are to the throwing away all the tests we have done in the past. As you know, I am sure, and as many of the members of the committee know——

Mr. HUNTER. But you understand what I am asking. Why don't it make sense to make a few tests to validate the system, the nontesting simulation?

Mr. REIS. Let me answer the question this way. We are getting back to the question you asked Dr. Smith. Of course, you know, from an engineering, from a scientific perspective one would always want to have a few—where does that—you would always like to have—you would certainly like to have more tools in your kit bag, you know, in your arsenal of testing and understanding in science. So there is always the opportunity to have more and you always sort of kind of want more.

What you want to develop right now is the way of, if you will, emphasizing the new tools and the new ways of doing this.

Mr. HUNTER. I understand.

Mr. REIS. Hooked basically into the over a thousand tests and the instrumentation and the diagnostics of the tests that we have done in the past.

Mr. HUNTER. I understand. I would think if I was engaging our other nations who wanted us to enter into this extended test ban, it would seem to be reasonable to say, OK, we are entering into this new program, we are not totally certain of it but it is a big challenge, to use your words, but we are going to enter into it.

But going into it, we need to validate that program. And we are going to make a couple of shots to validate it. It is in your interest that we continue this moratorium, and therefore it is in your interest that we validate the efficacy of this new tool, this nontesting tool.

Mr. Curtis, does that seem reasonable to you?

Mr. CURTIS. I think what Dr. Reis is responding that seems reasonable. The question is whether it is necessary to having confidence in the stockpile.

Mr. HUNTER. Thank you.

I have one question for the record, and I also want to give the gentleman from California a chance to ask any questions he has.

Dr. Smith, can you please summarize the activities, this is for the record, of the Nuclear Weapons Council in recent months, what decisions were taken and why, what are the council's concerns about the future of U.S. nuclear weapons, and how are these concerns being addressed.

Mr. SMITH. Mr. Chairman, it would be a pleasure to take that one for the record. We will get it back. We are very pleased with the way the council has been performing its duties.

[The following information was received for the record:]

ACTIVITIES OF THE NUCLEAR WEAPONS COUNCIL

The Council performs those functions designated in Section 179, Title 10, United States Code. The Council's primary focus is to provide coordination, guidance, and recommendations to the Secretary of Defense and Secretary of Energy on maintaining a reliable nuclear deterrent through a program that emphasizes the safe, secure, efficient, and effective operation of the nation's nuclear weapons stockpile and supporting infrastructure. To meet these responsibilities, the council conducted a series of meetings in 1994 to focus on its internal operations, review the DOE nuclear weapons laboratories, and review of the vital issues pertaining to the stockpile and the changing international security environment.

The Council met eight times in FY 1994 and addressed a wide variety of topics in its role as an advocate for the United States nuclear weapons stockpile. The Council addressed a number of issues: 1) a plan for acquiring tritium; 2) the capabilities of the DOE nuclear weapons laboratories; 3) DoD stockpile priorities; 4) the DOE Defense Programs budget; 5) the identification of nuclear materials excess to national security needs; and 6) declassification issues. Issues considered by the Council are usually developed by the Nuclear Weapons Council Standing and Safety Committee.

The principal challenge to the Council remains making recommendations to maintain a safe, secure, reliable, and effective nuclear weapons stockpile. New and innovative approaches will be required to achieve this goal given today's constraints.

Mr. HUNTER. Thank you.

Let me yield to my colleague from California. Ron, is it your pleasure that we keep going or that we come back after maybe an hour's break or what?

Mr. DELLUMS. Let me say this, Mr. Chairman. In my capacity as ranking member of the full committee, I see an important part of my responsibility is to try to be part of the corporate memory of what takes place here. Not many people left. So I am very eager to be in these hearings. I try not to miss any moment of it.

In order to give our next panel the respect to be accorded them for traveling such a great distance to be here, I would not want to rush that.

I have a 12:45 meeting dealing with ballistic missile defense briefing that we are having for members of our side that is very important. We also have Mr. Tony Lake coming over to talk about ABM implications. So that is a very important meeting. I want to host that.

So my thought would be that the better part of valor, unless you think you could get it done in 35 minutes, would be to come back at 2 p.m.

Mr. HUNTER. Fine. Will our next panel, the witnesses, be available at 2 p.m.? Are there any nays in the group?

OK. Gentlemen, thank you, and thanks for your endurance and your thoughtfulness.

The committee will resume at 2.

[Whereupon, at 12:10 p.m., the subcommittee was recessed, to reconvene at 2 p.m., this same day.]

AFTERNOON SESSION

Mr. HUNTER. The subcommittee will come to order.

We have in our second panel Dr. Hecker, director, Los Alamos National Laboratory; Dr. Bruise Tarter, director, Lawrence Livermore National Laboratory; Dr. Al Narath, director of Sandia National Laboratory.

Gentlemen, welcome. Thank you for sticking around, for having some patience with us, and letting us spend the morning with the

first panel. It might have proved useful because you were able to at least hear some commentary with respect to your organizations.

What I would like to do is just start; why don't we start right to left, with Mr. Hecker. Go ahead and give us your statements, if you can.

Without objection, all written statements you want to offer for the record will be accepted into the record.

I am informed that Mr. Dellums will be here in the next 10 or 15 minutes. But I think it is appropriate for us to start.

Dr. Hecker, the floor is yours.

Mr. HECKER. Actually, Mr. Chairman, if I may, we drew straws to see what the order of go might be, and we had checked that with Chris Williams. I lost, and I was going to go last. If you don't mind, what we had arranged is to start with Dr. Narath and then Bruce Tarter and then myself.

Mr. HUNTER. Dr. Narath, the floor is yours.

STATEMENT OF DR. ALBERT NARATH, DIRECTOR, SANDIA NATIONAL LABORATORY

Mr. NARATH. I certainly feel honored by the confidence that my good friend and colleague Dr. Hecker expresses in revealing the outcome of the game of chance that we played.

Also, thank you, Mr. Chairman. I certainly hope that this part of the hearing will not be anticlimactic. Perhaps we can offer some new insights.

I will not bore you with the details of the simple fact that we are living in a period of time where change is taking place, often more rapidly than we can easily adjust to. We are seeing a world quite unlike that that I have seen during the over 30 years that I have been associated with this program, and it offers a whole new set of challenges.

The task at hand appears fairly simple on the surface. It is simply to maintain a credible stockpile, and do so into the indefinite future, with emphasis, of course, not only on performance, but safety, security and reliability.

Part of this has to do with protecting the ability to manufacture replacements for aging weapons, which I think in years to come will be a major task, particularly since the weapons currently projected to be in the stockpile were all built during a relatively short span of time, and there will simply not be the capacity within the remaining complex to remanufacture all those weapons during that same narrow window in time. So some strategy will have to be adopted to remanufacture weapons when end of life is approached over a more protracted period of time.

We also have to protect the ability to execute new or modified designs, whether driven by new requirements or perhaps stockpile problems. Of course, we also have to contribute to the nuclear weapons-related imperative such as technical means of discouraging proliferation of weapons of mass destruction worldwide.

So these are fairly straightforward requirements. But standing in the way are some obstacles that I think are truly formidable. Let me just mention four of these.

Most profoundly disturbing to me and my laboratory, and I think to my colleagues as well, is the growing public indifference, if not

outright opposition to nuclear weapons. Equally unsettling are the persistent attacks on the Department of Energy and the uncertainties that this creates in an agency that for the time being remains the best home for this program.

All of this adds up to a very unfortunate consequence, and that is a very demoralizing effect on the staff, and management, I might say, and, by the way, a growing difficulty in attaining and attracting new talent. We do have to bring the next generation of scientists and engineers into the program at some reasonable rate.

Third, I worry about the declining weapon research and development [R&D] budget. At Sandia, that budget stands today at, roughly, half of what it was some 4 years ago. And there is no certainty that this free-fall, some people would describe it as a power dive, will be arrested any time soon.

Finally, of course, is the loss of the underground test capability upon which the knowledge base of the nuclear explosion subsystem is really—ultimately has to be built.

Now, the DOE defense program strategic plan, the so-called science-based stewardship, addresses these issues, and by the way, it has my very strong personal support. It envisions an agile virtual enterprise. It will achieve that by collapsing the existing production complex and moving production to the laboratories if it cannot be moved to the private sector.

By the way, at Sandia, we have already taken on some substantial production responsibility for limited-life components. They are being transferred from the Pinellas plant to Sandia.

This is an extremely complex, ambitious undertaking. There is financial risk involved. It will also require increased funding, especially beginning in fiscal 1997, if we are going to be successful in executing the plan. Such increases will save money in the long run and give additional assurance that we will execute the task assigned to us successfully.

I want to talk briefly about the role Sandia plays in the program and address very briefly our strategic plan and vision. As you know, Sandia's nuclear weapon stewardship responsibility focuses on the design of most, if not all, nonnuclear components and subsystems and weapons. Part of this is the integration of these components of subsystems into the total weapons system, that is an integration with a nuclear explosive subsystem.

We are also responsible for the certification of required safety, reliability, radiation hardness, and so on. All those parts of weapons that we have responsibility for.

Let me digress just for one moment and touch on a point that I don't feel was brought out in the morning session. The discussion this morning centered very much on the subject of test, or I should say, the loss of test.

I think we need to be very careful when we talk about test to distinguish what testing we are talking about. The test that we discussed this morning has to do with testing of the nuclear subsystem of a weapon. This, of course, is a collection of thousands of piece parts, all from safety-critical and security-critical nature that affect the rest of the system, and much of these pieces Sandia has responsibility for.

Now, these parts, of course, may not be of interest to you, because in principle, all of that can be tested and, in fact, is being tested as we speak, at least as concerns normal operational environments. There is a long history of establishing the reliability of all of this.

Now, when it comes to abnormal environments, and when you expressed concern about safety and security of weapons, you are really not dealing with normal environments. In the case of safety, you are dealing with potential airplane crashes, fires, maybe people shooting at weapons.

The safety that we talk about here has to be certified by the laboratories and at no time ever has it been possible to establish a statistically sound basis for assuring or guaranteeing that the system requirements, for example, the one part in a million requirement that under any conceivable accident scenario there can be no nuclear yield in excess of four pounds high explosive equivalent, that that can be guaranteed has to be based fundamentally on scientifically and technological understanding and judgment.

It is not subject to thorough testing. It has never been. And it is this reason and this reason primarily why the technical core competencies at Sandia have evolved around what we call science-based engineering.

We are also responsible for the design of specialized ancillary equipment, such things as use control, handling, shipping, storage, and maintenance of weapons. We have increasing responsibility for production, as I have already mentioned.

We have a major role in monitoring performance, testing, and assessing stockpile health; that is keeping a lot of people very busy. Of course, we provide, along with the other two labs, significant support for weapon dismantlement. And we have a very large program aimed at nonproliferation-related technologies.

Finally, we, like the other two labs, support an active and rapidly growing program involving lab-to-lab collaborations with Russian institutes. Very briefly, in regard to Sandia's strategic plan, at the highest level, this plan, which is in complete harmony with the DOE plan, contains four major elements: First of all, I think most importantly, we envision the continued need to operate Sandia as a multiprogram, multipurpose laboratory, for reasons that I think Under Secretary Charlie Curtis touched on quite eloquently earlier in the day.

It has been important, has been since the early 1970's, of augmenting support for our mission-critical capabilities. Of course, it also makes the lab a lot more attractive to people that we hope to bring into our community.

Second, industry-university technology partnerships, and I know this is a subject that is of some considerable interest to you. And let me say a few words about this, and if you are interested, I can elaborate later on. These collaborations, as we have evolved them, are playing an increasingly important role in helping us accomplish our mission objectives more effectively.

Let me say the technology transfer initiative as we are currently applying it, are an absolutely essential element in R&D strategy.

Third, support of our science-based engineering core competencies, and here we are specializing in four principal areas: ad-

vanced manufacturing technologies, electronics, the information, science and technologies, and pulse power, plus the necessary scientific underpinnings.

The fourth element of our strategy, not surprisingly, is the adoption and adaptation of best business practices. This is being done in line with DOE's commitment to total quality management principles, an effort to increase our efficiency, reduce cost. By the way, this is entirely consistent with the corporate culture of your parents, the Lockheed-Martin Corp.

Let me finish up and make the following concluding comments. I would like to return to the DOE defense program strategic plan and observe, first of all, there really can't be any doubt that this plan is of great volume, great importance to the future of this program. But let's be sure we understand that to be successful, it has to do at least three things:

As a first priority, it must protect the core R&D functions and capabilities at the laboratories. And that will require adequate R&D support and protection of TTI funds for the purposes already touched on.

Second, we have to provide resources for new technology initiatives, and that includes production of tritium, high-performance computing, and so on.

Finally, the plan has to provide for new specialized facilities. But I bring these to your attention in a prioritized order as something that I view as extremely important, because no matter what facilities you provide, if the foundations, the technical foundations within the laboratories are permitted to erode, the facilities will serve very little useful purpose.

This will require a very firm commitment on the part of the Congress, because it does require in the near term some substantial increases in financial support for the program. If we cannot envision such increases, then I suggest we have to rethink the plan.

Now, I am not known to whine to congressional committees or anyone else when the going gets tough. And I think it will be tough. But I think I would be remiss if I didn't end with some concluding observations. The nuclear weapon program differs from other defense activities in many fundamental ways, ways that perhaps, time permitting, we can discuss later.

It absolutely needs to regain some adequate measure of stability. It needs a firm sense of direction, a strong commitment by all parties, a commitment to a set of sensible objectives. It needs a steady hand on the wheel and a road without excessive obstacles. And by the way, and finally, it would surely benefit from a few cheerleaders along the way.

Thank you.

Mr. DELLUMS. Did you say the nuclear weapon system program?

Mr. NARATH. The nuclear weapon program, yes, sir.

Thank you, Mr. Chairman.

Mr. HUNTER. Cheerleaders are wanted.

Thank you, Dr. Narath.

Statement of Albert Narath, Director
Sandia National Laboratories

United States House of Representatives
Committee on National Security
Subcommittee on Military Procurement

March 29, 1995

Sandia National Laboratories

". . . exceptional service in the national interest"

A Multiprogram Laboratory of the U.S. Department of Energy

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1. Introduction

Chairman Hunter and distinguished members of the subcommittee, I am Al Narath, director of Sandia National Laboratories of the Department of Energy (DOE). Sandia National Laboratories is managed by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation. It performs scientific and engineering research and technology development in support of DOE's missions in national security, energy, environment, and the basic sciences. Sandia plays a central role in the national security missions of the Department of Energy, and it is the only national laboratory with stewardship responsibility for every nuclear weapon in our nation's deterrent stockpile.

I welcome this opportunity to share with you my views on the challenges facing the DOE Defense Programs laboratories as the post–cold war era continues to unfold. We have formidable responsibilities that will endure indefinitely, particularly with respect to the nation's nuclear-weapon stockpile, and we take those responsibilities very seriously. At the same time, we are sensitive to the fact that the federal budget is under great pressure. Our challenge is strategic: How do we maintain the technical competencies required for our DOE missions as budgetary resources become more constrained?

I will begin my remarks by describing Sandia's role in the nuclear-weapon stockpile stewardship and management program. I will then outline our strategy for preserving and advancing the technical capabilities we will require for our DOE national security missions in the future. Following that discussion, I will briefly describe Sandia's role in nonproliferation, arms control, and intelligence work and tell of our recent interactions with the nuclear-weapons laboratories of the former Soviet Union. I shall conclude my statement with some observations on policies and actions that can help the DOE laboratories maintain their technical leadership well into the next century.

2. Sandia's Responsibilities in Stockpile Stewardship

Sandia has a central role to play in DOE's stockpile stewardship and management program, particularly in the areas of maintaining confidence in stockpile safety and reliability, providing an efficient production complex for the smaller stockpile of the future, and providing for long-range support of the enduring stockpile.

Nuclear-weapon work at Sandia is carried out in close cooperation with Los Alamos and Lawrence Livermore national laboratories, who are responsible for the nuclear explosive subsystems of nuclear weapons. Sandia's role in nuclear-weapon development is to integrate the nuclear explosive subsystem with many other components (most of which are designed by Sandia) to achieve the desired military capabilities of a weapon. At the same time, we must

assure that the extreme requirements for safety and control are achieved. We also certify the required radiation hardening of all nonnuclear DOE components in a weapon system.

Sandia's principal nuclear-weapon design responsibilities include the following: safing, arming, fuzing, and firing systems; use-control systems; external neutron initiation systems; gas transfer systems; and delivery system interfaces. In addition, Sandia is responsible for ancillary equipment used by the military services to support nuclear-weapon operations in the areas of use control, handling, shipping, storage, and maintenance. We provide field engineering support and liaison with the military services through the entire service life of every nuclear weapon.

As DOE restructures its production complex, Sandia is also assuming a larger responsibility for nonnuclear component production. It is clear that DOE expects Sandia to perform an expanding role in this activity. The closure of DOE's Pinellas and Mound facilities requires that Sandia take on responsibility for producing neutron generators and other specialized components. It will also be Sandia's responsibility to manage production procurements for components available in industry and needed for DOE's stockpile stewardship mission. We are currently on schedule to implement DOE's reconfiguration plan for nonnuclear component production. This reconfiguration will save DOE money and permit production of these components to continue at the laboratories for stockpile needs. We expect our production facility to be operational in 1997.

Sandia's duties in stockpile stewardship include maintaining the weapons in the stockpile throughout their life cycles; monitoring, testing, and assessing stockpile health; developing and retrofitting nuclear weapons as required; developing and maintaining equipment required to support nuclear-weapon logistics and operations; developing and maintaining capabilities for safe and secure transportation and storage of nuclear weapons; and supporting the dismantlement of nuclear weapons retired from the stockpile.

Surety is an important Sandia responsibility in stockpile stewardship. It addresses weapon-safety issues raised by the Drell Panel[1] in their 1990 report, as well as concerns related to transportation and handling, logistical problems associated with retirement and dismantlement, requirements of a smaller and more flexible stockpile, and increased sensitivity toward environmental safety and health issues. Sandia's surety strategy is based on the principle that the surety of any high-consequence product or operation must be continuously updated as advances in technology permit. It is unreasonable to assume that the surety technologies presently utilized in the stockpile will be sufficient for the future. What was acceptable twenty years ago is not acceptable today. As technology advances and renders new surety improvements feasible, we will have an obligation to incorporate those new developments.

It is Sandia's responsibility to develop the technical means to assure confidence in the safety, security, and control of nuclear weapons in all environments. The ability to attain this confidence now and in the future for nuclear weapons and other high-consequence activities is of strategic importance to the nation. We develop and promulgate the underlying science, technologies, methodologies, prototypical components, and system architectures for the advancement of surety.

Sandia also provides the technical military manuals and training that enable the armed services to maintain stockpile readiness while ensuring safety and control. Training is conducted

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[1] The Drell Panel, formally the *Panel on Nuclear Weapons Safety*, evaluated the safety of U.S. nuclear-weapon systems for the House Armed Services Committee in 1990.

at Sandia for military logistics specialists who, in turn, train other military personnel. Sandia provides on-site field training for the military in response to their needs and requirements.

Sandia supports DOE's Stockpile Evaluation Program by analyzing and testing weapons as they enter the stockpile and by evaluating weapons withdrawn from the stockpile. As defects or problems are identified, changes are made to improve operations and maintenance. The Stockpile Evaluation Program relies heavily on the basic skills required to develop nuclear weapons. Among those skills are materials science, electronic piece-part and subassembly design, electromechanical component design, structural design, applied mechanics analysis, and environmental testing.

Our capabilities for the responsibilities of stockpile stewardship (including component design) are science-based; that is, we are dependent upon a deep science and technology infrastructure, including technical expertise and facilities, to support DOE Defense Programs missions. Consequently, it is very important for Sandia to maintain and improve its understanding of the science of complex nuclear-weapon systems. We must advance the technologies necessary for nuclear-weapon design, engineering, production, certification, and retirement, including warhead dismantlement and the proper disposal of hazardous materials.

In stockpile stewardship, it is essential to maintain an active, functioning design capability for weapon components, just as it is important to preserve a residual capability for nuclear explosives design. The stockpile of the future will comprise fewer weapon types and will rely on established nuclear designs. Modernization and improvements will primarily occur in the nonnuclear subsystems surrounding the nuclear explosive.

Long after START I and START II are implemented, Sandia and its sister Defense Programs laboratories, Los Alamos and Lawrence Livermore, will remain the nation's technical conscience for the nuclear-weapon stockpile. The institutional memory and continuity, the experience base, and the engineering expertise for nuclear warheads as integrated systems will continue to reside at Sandia.

3. Preserving and Advancing Technical Capabilities for Stockpile Stewardship

The general public (and many public officials) suffer from an erroneous perception that very little work remains for the DOE laboratories in nuclear-weapon research and development (R&D). The end of the cold war and the lack of any new nuclear-weapon development requirement has created a malaise in public attitudes toward defense, in general, and nuclear deterrence, in particular. However, the technical challenges of stockpile stewardship are formidable and require sustained technical excellence and adequate funding support.

The nuclear-weapon R&D program supports the technical foundations for all nuclear-weapon design, engineering, testing, and stockpile stewardship. The program also sustains the core capabilities needed to support all atomic energy defense activities, including those falling outside the direct responsibility of the DOE Assistant Secretary for Defense Programs. These include arms control, nonproliferation, and environmental restoration and waste management at DOE sites. These capabilities are of critical importance to the DOE Office of Nonproliferation and National Security with regard to assessment of possible nuclear-weapon development activities in foreign countries.

Sandia and its sister laboratories face particular challenges today in fulfilling DOE's stewardship role for the stockpile. First, to continue to certify the safety and reliability of the

stockpile, not only in the absence of underground nuclear testing but also with decreased reliance on expensive environmental tests, we are forced to place a much larger fraction of our confidence on numerical modeling and analysis. This necessitates a continuing thrust in substantially improving our computational capabilities. To respond to this challenge, DOE has created the multi-laboratory Accelerated Strategic Computing Initiative (ASCI).

Secondly, while we fully recognize that certain components in existing weapons must be replaced at periodic intervals, all weapons now in stockpile will reach the end of their design lifetimes in the next two decades. It is unrealistic, both technically and fiscally, to maintain the vast production infrastructure that was capable of producing replacement weapons for a stockpile five or ten times the size now projected. To ensure that this future requirement can be affordably met, DOE, through its defense programs laboratories, is also embarking on a major thrust in Advanced Design and Production Technologies (ADAPT).

A third challenge centers on general proliferation concerns and, in particular, on assuring that the former Soviet Union continues its plan of substantially reducing its stockpile without undue safety or proliferation impacts. Ironically, some of our stockpile stewardship capabilities can be shared with the Russians to help them become better stewards of their stockpile, particularly in the areas of stockpile security and dismantlement.

Today and into the foreseeable future, Sandia's ability to execute its stockpile stewardship responsibilities will depend on maintaining a strong, integrated technical foundation. We must preserve, sustain, and continuously enhance the core intellectual, technological, and physical infrastructure necessary to support the requirements of the nuclear-weapons complex.

A world-class base of scientific and technological excellence has always been the critical factor in meeting the extreme demands placed on nuclear weapons, especially in regard to weapon safety, security, and reliability. These are areas of major Sandia responsibility. Our ability to sustain this technical base has been made especially difficult over the past eight years by a sharp decline in weapon R&D funding. Today, the ability of the nuclear-weapon program to preserve and strengthen Sandia's essential technical foundations stands at an all-time low. To assure the safety and reliability of the stockpile, we require a sustained level of R&D funding adequate to support our technical foundations and strategic capabilities.

A strong commitment to preserving and advancing a set of core technical competencies serving the needs of the nuclear-weapon program and other customers has become a central strategy for Sandia's future. The science and technology needs that characterize DOE's nuclear-weapon mission are extremely broad, covering most of the physical sciences and engineering disciplines recognized today, as well as the computational and supporting technologies required for modern scientific investigation.

A critically important element of Sandia's strategy is a strong commitment to R&D partnerships with industry and universities as a way to increase the rate of progress in satisfying DOE's mission needs. Sandia's success in establishing mutually beneficial relationships with the private sector is in large measure a consequence of Sandia's core competencies being well aligned with private-sector interests. This strategy is entirely compatible with the recommendations of the recent report of the Secretary of Energy's Task Force on Alternative Futures for the DOE National Laboratories (the Galvin report), which endorses laboratory-industry collaboration in areas germane to DOE missions.

Consistent with Sandia's role in the weapons program, our core competencies derive from a matrix of scientific and integrated technological initiatives that are most generally described by the term, "science-based engineering." Sandia's scientific research is focused on materials, microelectronics and photonics, computational and information sciences, and engineering sciences. Sandia's principal integrated technological initiatives or "thrusts"—advanced manufacturing technology, electronics technology, advanced information technology, and pulsed power technology—are firmly rooted in our scientific foundations and national security missions. We commonly refer to these thrusts as "strategic initiatives," because they are technologies of vital importance to DOE's future missions success. Taken collectively, they comprise a tightly integrated body of technical work in which it is difficult to distinguish between "basic research," "applied research," and "technology development."

3.1. Advanced Manufacturing Technology

Sandia's strategic initiative in Advanced Manufacturing Technology derives from its long-standing responsibility for engineering design of DOE nonnuclear components. As a consequence of our responsibilities in systems and design engineering, production process development, intelligent machine research and development, and oversight of the performance and reliability of nonnuclear weapon components over the last forty years, we have become the leader among DOE laboratories for advanced manufacturing technologies. Manufacturing support technologies are central to our mission for DOE Defense Programs and constitute a large fraction of our technology base.

This initiative vigorously supports DOE's strategic requirement for Advanced Design and Production Technologies (ADAPT), an important element of the Defense Programs strategic plan. The goals of ADAPT are to enable an affordable design and production capability for DOE in the long term and to continuously support stockpile assurance activities.

ADAPT is a research and development initiative to deliver revolutionary advances in product realization for future management of the nuclear-weapons stockpile. The goal of the initiative is to assure an enduring stockpile in an environment of greatly reduced defense expenditures and constant change. ADAPT will exploit advances information, computation, and communications technologies to integrate advanced design, modeling, materials, and process tools and methods to create a product realization environment that will enable the continued delivery of safe and reliable products to DOE defense customers. To be successful, ADAPT cannot merely develop a new suite of manufacturing technologies; it must provide a new way of conducting the business of designing, developing, and delivering DOE products to customers. The success of the initiative will be measured by the ability of the nuclear-weapons complex to quickly deliver ultra-high-reliability products in low volume at minimum system cost.

Most of the weapons in the enduring stockpile were designed and qualified for stockpile lives of twenty to twenty-five years, and while they can be expected to remain safe and reliable for periods in excess of their design life, limited data exists to predict what the actual service life will be. It is certain that the reliability of warheads in stockpile will degrade with time unless action is taken to repair, requalify, or renew them. Furthermore, experience shows that independent of the effects of aging, a significant unexpected defect affecting one of the weapon systems in the stockpile will be discovered about once every year. Finally, the warheads that constitute the enduring stockpile were all developed and produced within a rather limited time span, so they all

contain similar parts and components and were produced with similar processes. This heightens a concern that significant portions of the aging stockpile may be subject to common failure modes.

It is clear that to ensure that the stockpile remains safe, secure, and reliable, the nuclear-weapons complex must establish and retain the capabilities needed to repair, requalify, or renew warheads in the stockpile. Furthermore, it is important that the complex maintain the capability to design and develop new weapon components and subsystems since military requirements may change. Moreover, it will be impossible to precisely duplicate the weapons currently in the stockpile, since the original technologies may be obsolete, the original materials and processes may no longer be available, and original facilities may no longer be usable.

To meet the challenge of delivering first-time, high-quality hardware and to minimize costs, we must apply advanced information and communication technologies to create a virtual factory environment including both commercial and in-house sources using commercial components and processes to the greatest extent reasonable.

Professional staff within the nuclear-weapons complex must be more effectively utilized. Computational tools must be developed to enable individual scientists and engineers to deal effectively with a wider spectrum of problems than is typical today. Computational tools will allow the rapid optimization of component designs for performance, cost, and manufacturability. Other tools will facilitate the selection, specification, and integration of commercial components and low-impact processes and technologies.

For a variety of security, business, or technical reasons, it is impractical to rely on industry for all the components required for nuclear weapons. This is particularly true for components that are unique to nuclear weapons. Consequently, DOE must retain a core in-house manufacturing capability, including some manufacturing facilities. To most effectively use these capabilities, new or improved materials and processes must be developed to enhance efficiency, minimize wastes, environmental impacts, and cost, and provide greater worker safety. Where possible, such facilities should be rapidly reconfigurable to support the manufacture of a spectrum of parts or components.

The ADAPT initiative will be composed of a variety of specific activities conducted within six cross-cutting technical programmatic elements. The "knowledge engineering" element will retain and facilitate access to weapon design, engineering, materials, processes, and fabrication expertise. The "virtual manufacturing" element will implement integrated tools for manufacturing operations. The "modeling and simulation" element will develop tools for model-based design, process simulation, and performance prediction. The "advanced materials and processes" element will develop materials, manufacturing, and qualification processes for an affordable, reliable stockpile. The "information and communications element" will develop the hardware and software infrastructure for distributed design, process engineering, and manufacturing. It will also establish electronic and administrative business methodologies that will enhance agility, reduce cost, and involve industry.

The problems facing the DOE nuclear-weapons production complex are formidable. The future operating environment will require manufacturing agility and cost-effectiveness. We will have to design and manufacture to the highest standards of quality. Production will have to occur in an environmentally conscious manner. The nuclear-weapon laboratories must continue to design for the total life cycle, including retirement, dismantlement, and disposal or recycling of components and materials. DOE cannot accomplish this mission in isolation from the nation's

manufacturing community. Therefore, we regard our collaborative work with industry in areas of germane to the DOE production mission as vital to our success.

Our Center for Advanced Manufacturing Technology at Sandia's New Mexico location provides a forum for collaborative work with industry on the manufacturing needs of both the DOE nuclear-weapons complex and commercial manufacturers. Sandia's California location is strategically important to our advanced manufacturing initiative as a point of contact with the high-technology industries of the West Coast. The Integrated Manufacturing Technologies Laboratory in Livermore conducts collaborative research and development in materials and processes, process simulation, engineering design, and manufacturing technology support. It also performs research in prototype fabrication and demonstration techniques for agile manufacturing, both for DOE and the domestic industrial sector. Current work focuses on metal removal and welding, weld process simulation, composites fabrication, high-speed communication of manufacturing data, and on-line monitoring and control.

The investment in the ADAPT initiative will result in a nuclear-weapons complex that will be able to safely, efficiently, and cost-effectively repair, requalify, or renew weapons and components in the enduring stockpile as they age. This capability will, in turn, provide an affordable, safe, and reliable nuclear deterrent.

3.2. Electronics Technology

Electronics technology is critical to the DOE defense mission, and it is especially important for Sandia's responsibilities in component design. Special-purpose electronic components in nuclear weapons include coded switches that prevent unauthorized use, tamper detectors, programmers that control the arming and firing sequence of the weapon, radars, and fuzing and firing sets. These devices must operate reliably over a large temperature range, survive strong mechanical shock, and be fully functional following exposure to intense pulses of ionizing and electromagnetic radiation.

Electronics is also critical in nonweapon applications of DOE national security programs. Satellites that monitor compliance with international arms control agreements require microelectronic devices hardened against the ionizing radiation of space. Application-specific microprocessors and embedded computers are needed by many of the systems used to verify treaty compliance and assess activity in foreign countries that may indicate work on weapons of mass destruction. Also, advanced sensors such as chemical microsensors, light detecting and ranging (lidar) systems, and high-performance synthetic aperture radars developed in this program element offer new capabilities for arms control and proliferation assessments.

DOE's requirements for many electronic devices cannot be met with commercial electronic products. Sandia is unique among the national laboratories in having design and production oversight responsibility for all electronic components in DOE nuclear-weapon systems. Sandia's successful fulfillment of this mission has created a world-class capability to design, model, test, and prototype electronic subsystems. To meet its mission requirements, Sandia has developed a broad-based competency in electronics, from the fundamental science of semiconducting materials to device design and manufacturing processes. We can only maintain this capability in partnership with industry, and our program collaborates intensely with the semiconductor industry and universities through consortia and other arrangements.

One way in which we interact with industry is through team pursuit of industry-generated technology road maps such as those prepared by the Semiconductor Industry Association and the

Optoelectronics Industry Development Association. In addition, we provide a direct mechanism for applying university research to manufacturable electronics products and processes.

Sandia's Center for Microelectronics Technologies provides a unique capability for research and development relevant to both DOE and industry. This capability is being accessed by industry through a five-year, $100 million cooperative research and development agreement (CRADA) with the SEMATECH consortium, as well as through CRADAs with individual companies. The center is supported by a large range of semiconductor and microelectronics capabilities. Activities of the center in support of the US semiconductor industry include the Semiconductor Equipment Technology Center (SETEC), the Contamination-Free Manufacturing Research Center, and the Equipment Design Support Center—all joint projects with SEMATECH.

Sandia's Electronic Quality/Reliability Center (ERQC) performs cooperative research and development to understand why devices fail and to develop new reliability and failure analysis techniques. ERQC has an extensive interdisciplinary capability in characterization, benchmarking, assessment, modeling, and simulation. Sandia's reliability engineering program focuses on ultra-reliability in electronic components for nuclear weapons, and those techniques are synergistic with the capabilities and needs of commercial electronics manufacturers.

Cooperative R&D agreements (CRADAs) with interested industrial participants yield significant benefits to the nuclear-weapons program and help reduce the cost of this research to DOE. The Electronic Quality/Reliability Center has entered into ten CRADAs with manufacturers of integrated circuits (ICs) or related equipment or software. CRADA partners include Intel, National Semiconductor, LSI Logic, Advanced Micro Devices, Philips, Analog Devices, Schlumberger, Hewlett Packard, Honeywell, and Micron. These partnerships are rooted in the reliability needs of Defense Programs and have produced significant benefits to DOE.

For example, the CRADA with Philips has advanced our understanding of stress voiding, a failure mode that seriously affected DP electronics three times in the 1980s. A CRADA with Intel and others perfected failure analysis techniques developed at Sandia for rapid failure location of problems in the stockpile. A CRADA with Hewlett Packard developed software for a fast, standardized approach to assessing reliability. A CRADA with Schlumberger developed a failure analysis expert system that will preserve DOE knowledge on diagnosing failures for the life of the enduring stockpile. CRADAs with Advanced Micro Devices, LSI, Analog, and National Semiconductor have extended the our reliability benchmarking database which can be used to select the best manufactures of integrated circuits for ultra-high-reliability requirements of government systems. At completion, these CRADAs will have brought in over $850,000 in cash (funds-in) and over $500,000 in capital equipment and software to the DOE program. In addition, the CRADA with Hewlett Packard is returning royalty income to DOE from software sales. These CRADAs have also provided significant derivative economic benefits to the industry partners.

Photonics is an emerging technology that uses visible-light energy for functions normally performed by electrical energy. Because of their inherent immunity to electromagnetic interference and their tolerance to the effects of ionizing radiation and intense pulses of electromagnetic radiation, photonic devices offer unique advantages over electronic devices for a wide variety of applications in nuclear weapons.

Sensor research and development in this program element include radars used to command the firing of a weapon and provide precision terminal guidance, components that detect unauthorized tampering, use-control devices, accelerometers, and chemical sensors to assess the condition of weapons in stockpile.

Other applications of Sandia's electronics technology initiative directly impact the nuclear-weapons stockpile, weapons surety, advanced weapons designs, and process sensing/control for the nuclear-weapons complex. One envisioned application is advanced, chemically selective sensor arrays integrated with radiation sensors to detect very low levels of corrosion by-products to monitor the integrity of the stockpile and indicate potential problems. Chemical sensors are now used to monitor weapon production processes by providing real-time control of possible chemical emissions into effluent streams at DOE manufacturing facilities. This is an application for which laboratory-sized analytical instruments are not cost-effective or suitable due to power, space, and time limitations.

DOE's strategic investment in Sandia's electronics competency is crucial to stockpile stewardship now and in the future. As the stockpile ages, replacement weapons must incorporate contemporary electronics technology, modified to meet the stringent performance requirements for nuclear weapons. Many of the nuclear-weapon systems in stockpile are decades old and contain antiquated technologies such as discrete-component electronics and even vacuum tubes. It is not possible to maintain subsystems based on obsolete technologies for which the contemporary industrial base no longer exists. An important responsibility of the nuclear-weapon R&D program—and a major responsibility for Sandia—is the modernization of nonnuclear component subsystems of weapons in stockpile. This capability can only be kept modern through intensive collaboration with industry and university researchers.

3.3. Advanced Information Technology

Under the nuclear-weapons R&D program, Sandia develops and maintains the advanced computational capabilities that are essential to our nuclear-weapon responsibilities. In the broadest terms, computation and modeling, through the simulation and modeling of complex systems, reduce overall program costs by assisting with risk reduction early in the system life cycle and reducing the need for physical testing.

DOE's stockpile stewardship and management program will rely on computational simulation to compensate, to the extent possible, for the loss of experimental capability resulting from the U.S. commitment to end underground nuclear testing. In addition, the ability to design nonnuclear components of nuclear weapons, analyze their performance, predict their safety and reliability as they age, and certify their functionality as an integrated system is essential for conscientious management of the enduring stockpile. This activity, which is a central responsibility of Sandia, ordinarily requires expensive environmental testing. Computational simulation will help avoid much of the cost of this kind of testing.

The Accelerated Strategic Computing Initiative (ASCI) is a DOE Defense Programs initiative designed to support the stewardship of the enduring nuclear stockpile without the benefit of nuclear testing and with limited nonnuclear tests. The summary goal of ASCI is to promptly shift from test-based to computational-based methods as the basis for stockpile stewardship.

Computational simulation must be developed further if it is to be suitable as a surrogate means for verifying the safety, reliability, and performance of the nuclear stockpile. Virtual testing and prototyping rely primarily on the use of validated, numerical simulation tools for

certifying weapon performance, safety, and reliability, as well as for weapon design and manufacture. Rudimentary versions of virtual testing and prototyping exist today. However, to meet the needs of stockpile stewardship in the year 2010, virtual applications must achieve high-resolution, full-physics, and full-system capabilities.

Such a level of simulation requires high-performance computing far beyond the current level of performance. Current simulation applications are limited by today's computing capabilities, rely heavily on testing, and are not adequate for a detailed, independent analysis of new designs or unanticipated changes in existing designs. In addition, these applications were not designed to operate efficiently on the massively parallel processor (MPP) architectures that will be required for virtual testing and prototyping. These applications must be rewritten to incorporate refined physics algorithms, three-dimensional capabilities, and MPP efficiency.

In the area of high-end computing for ASCI, Sandia will have lead responsibility for a research partnership with the computing industry which will focus on the development of a new massively parallel computer composed of thousands of processors, providing teraflop performance and terabyte memory capacity. This effort will capitalize on Sandia's expertise and leadership in computer science and high-performance computing to deliver a new computing capability that will support the development of defense programs application codes.

Sandia's strategic initiative in advanced information technology is aimed at developing massively parallel computing technology and a software infrastructure for parallel computing. One of our distinguishing strengths in this area is the ability to develop and integrate theoretical models, advanced numerical methods, and computing technology to create robust, state-of-the-art tools for simulating complex systems and processes.

The Massively Parallel Computing Research Laboratory at Sandia is a national resource for research in high-performance computing and its application to practical problems in science and engineering. An interdisciplinary team of more than sixty research staff carries out projects in computational and computer science and in discrete and numerical mathematics.

The Massively Parallel Computing Research Laboratory has led the development of algorithms since its award-winning introduction of massively parallel techniques for real engineering applications in 1987. Since then, several awards have been received recognizing Sandia's ongoing contributions to massively parallel computation. Most recently, a Sandia/Intel team regained the world computational speed record from the Japanese by a large margin, after having lost it to the Japanese a few months earlier.

In their work to advance the state of computational simulation, researchers at the laboratory have invented massively parallel linear algebra methods, new algorithms for molecular mechanics and dynamics, highly scalable methods for quantum chemistry, automatic finite-element adaptive mesh-generation techniques, powerful domain-decomposition and load-balancing techniques, and data visualization methods. Advances in systems technology include portable, lightweight parallel and distributed operating systems, virtual reality environments, new multi-threaded architectures, object-oriented C++ constructs for massively parallel applications, and new routing algorithms. Numerical research at the Massively Parallel Computing Research Laboratory is complemented by research in discrete mathematics that includes algorithms for difficult combinatorial optimization problems. This work also involves new communications algorithms for parallel and distributed computing.

For the Advanced Applications Development thrust of the ASCI initiative, Sandia has proposed four projects which will provide advanced simulation capabilities for three important classes of problems. In the area of virtual testing and safety, we have proposed the development of a capability for simulating accident environments, predicting full weapon-system response, and assessing nuclear detonation safety for complex combined-environment accident scenarios. An aircraft crash/burn scenario is the risk-dominant hypothesis for most stockpile weapons.

In the area of material aging, we have proposed a project to develop a capability for predicting grain-scale microcracks in solder joints, which occurs as a result of thermal fluctuations during weapon storage and transportation and which has led to electrical component failures. A second proposed material aging project is to develop a capability for predicting the dominant factors in oxidation and deterioration of the Kevlar polymeric material used in parachute strapping for laydown bombs. There are no data on Kevlar aging, due to its relatively recent development, and the proposed simulation methods will be useful for predicting the lifetime of a parachute and for identifying the environmental factors that can be controlled to prolong its service life.

In the area of virtual prototyping, we have proposed a project that will develop computational methods for specifying the forging and welding process variables for remanufacture of limited-life components in gas transfer systems. If successful, this project has the potential to save DOE money by permitting standard industry practices that can provide the required performance of certain manufactured parts for nuclear weapons.

Finally, Sandia will also play an important role in the development of the infrastructure required to support the use and availability of the high-end computing platforms to be developed by ASCI. This infrastructure includes operating systems, high-speed networks, and high-speed storage. This effort will capitalize on Sandia expertise and leadership in high-performance computing and networking.

3.4. Pulsed Power Technology

Pulsed Power accelerators provide uniquely large, energetic, and powerful laboratory environments for the nuclear-weapon program. Pulsed power accelerators were originally developed to simulate the output of nuclear-weapon explosions on electronics, but have been broadly applied to inertial confinement fusion, beam/matter interaction, and to generation of large x-ray yields. The three most powerful accelerators in existence are applied to defense programs at Sandia. Saturn produces 20 TW (terawatts) of 1 MeV (million-electron-volt) x-rays, and Hermes III produces 15 TW of 20 MeV x-rays for radiation effects science and simulation. PBFA II produces 10 TW of 9 MeV lithium ion beams for ion-driven ICF target experiments.

The high-energy-density plasma environments created by these accelerators are used to simulate the effects of nuclear-weapon explosions on weapon components, study nuclear-weapon physics in the laboratory, and study the physics of inertial confinement fusion targets. These capabilities are distinct from, and complementary to, laboratory environments produced using laser techniques. For example, the temperatures produced today by these accelerators are typically one-quarter to one-third those produced by lasers, but the volumes heated today are 50 times larger than those heated by lasers at comparable temperature; the energies in x-rays are 20 times larger, and the duration of the x-ray pulse is 10 times longer. Thus, for certain technical issues such as radiation production and flow and many related weapon issues, pulsed power accelerators provide a very substantial benefit.

I am pleased to say that because of advances made in just the past few years, the promise of this technology to deliver energetic sources of x-rays efficiently and at low cost for the nuclear-weapon program has been achieved. For example, the x-ray environment available today on the Saturn accelerator at Sandia consists of 600,000 joules of x-ray energy in a volume of 5,000 cubic millimeters for a time scale of 20 nanoseconds produced with an overall efficiency from wall plug to x-rays that now exceeds 15 percent. Saturn is the most energetic source available in a short pulse for studies of x-ray physics.

The progress does not stop here. The integration of multidimensional computational codes, precise space-time- and spectrally-resolving diagnostics, and powerful laboratory experiments has furnished an important scientific basis for extrapolating laboratory environments to even greater energies and utility for the nuclear-weapon program. One of our near-term objectives is to advance the x-ray environment demonstrated on Saturn to greater energy in our PBFA II accelerator. With data from PBFA II, we expect to have confidence in the extrapolation of the x-ray source for the weapons program to a level exceeding 10 million joules of x-rays.

This advance would occur in a step beyond our present facilities in the proposed Jupiter accelerator. Jupiter is intended to permit laboratory research into the high-energy-density physics that underpins DOE's weapon physics program. It will also replicate a wide range of x-ray environments previously provided by underground nuclear experiments. Such capabilities will make it possible to continue testing components and systems without underground testing. We also look forward to the continued close involvement in applying pulsed power accelerator environments to all aspects of the nuclear-weapon program through multidisciplinary, multi-laboratory teams that already exist with Los Alamos and Livermore National Laboratories.

4. Nonproliferation and Counterproliferation

Sandia supports DOE with research, development, and analysis for intelligence, proliferation detection, arms control, and verification technology. Sandia has one of the oldest and largest programs of such work in support of U.S. national security policy. This work continues to complement our nuclear-weapon research and development responsibility, which provides requisite expertise for knowledgeable nonproliferation and arms control R&D activities.

The Verification and Control Technologies program includes R&D on a variety of systems, technologies, and processes applicable to the detection of proliferation of weapons of mass destruction and verification of agreements for transparency and arms limitations. An increasingly important aspect of all these program areas is Sandia's activity in information management, fusion, and analysis.

Sandia is developing new nuclear detonation sensors for improved detection of low-yield explosions in the atmosphere. Instrumentation systems currently being deployed on the Global Positioning System constellation of satellites will soon provide continuous worldwide coverage. Data from these instruments are also used by DoD (which shares system costs) to support their tactical warning and attack assessment mission.

We have initiated development of satellite-based systems and technology for detecting and characterizing nuclear proliferation activities. Such systems could have potential application to the detection of chemical weapons, biological weapons, and missile development as well. In conjunction with Los Alamos National Laboratory, we are developing an advanced multispectral thermal imager. Working with Los Alamos, Lawrence Livermore, Pacific Northwest, and Brookhaven national laboratories, we are developing laser-based techniques for remote detection

and identification of chemical species in effluent plumes emanating from suspect sites. Both of these concepts could be developed into operational integrated systems.

Sandia has projects to develop chemical sensors related to nuclear and chemical weapons, ultraviolet light detection and lidar ranging technology, radiation detection sensors, remote video surveillance systems, and the nondestructive determination of particulate compositions. In some instances, component technology will be incorporated into unattended, and possibly remote, ground-based sensor systems.

We develop synthetic aperture radar systems for a wide variety of treaty verification and nonproliferation applications. We are also exploring the integration of synthetic aperture radar with other imaging data and automated data analysis as methods for dealing with the large volume of data from such systems. Synthetic aperture radar will be used to evaluate all-weather as well as day-and-night aerial inspection capabilities.

Tags and seals are currently being considered for use in securing key elements associated with the Chemical Weapon Convention, weapon dismantlement, and the containers designated to transport and store U.S. and Russian special nuclear material. Sandia has also broadened the tag and seal effort to include the technological area of information integrity, which covers the general application of tags and seals over a wide range of monitoring applications. New data-authentication techniques are being developed to provide security for remotely monitored, sensor-based sealing systems.

Development of seismic technology for detection, location, and identification of underground and underwater nuclear explosions is continuing. In line with the emerging geopolitical climate, the emphasis of this program has shifted from the monitoring of bilateral test limitation agreements to global monitoring of a comprehensive test ban, as well as monitoring of proliferation-related nuclear testing. Our R&D activities are a part of a multi-laboratory effort and are focused on verification-quality seismic and hydro-acoustic data acquisition and processing that is affordable, easily deployable, and flexible. Our technology development activities are being coordinated, and in many cases co-funded, by DoD, which has the operational nuclear test monitoring responsibility within the U.S. government.

During the cold war, Sandia and the other DOE Defense Programs laboratories worked as a team with DoD to design, develop, manufacture, and maintain a credible, safe, secure, and robust nuclear deterrent. In carrying out that mission, the laboratories invested in extensive capabilities for research, development, product realization, and testing of nuclear weapons. These capabilities include state-of-the-art theoretical and simulation methods using the world's fastest computers, advanced materials laboratories and process control technologies, systems engineering and technology integration skills, and an extensive set of field test capabilities. In addition, the laboratories developed sensors and information systems to support the requirements for monitoring and verifying international arms control agreements. These systems include both space-based and ground-based global nuclear detonation detection sensors and the information networks and data processing capabilities to integrate them.

These skills, capabilities, and facilities can be readily applied to the counterproliferation challenge, and the successful teamwork relationship we have had with DoD for the last half-century can still be a formula for success. Some DOE weapons programs facilities, such as the underground nuclear testing facilities in Nevada, will have to be maintained in a state of readiness even though testing of nuclear weapons is unlikely to resume in the foreseeable future.

These facilities can provide a cost-effective test bed for counterproliferation technology development in conjunction with DoD. It would be a prudent use of the government investment in these facilities to employ the DOE nuclear-weapon laboratories to help resolve critical technical issues related to counterproliferation. This activity should be in partnership with the armed services, the DoD laboratories, and industry groups who will provide the actual counterproliferation hardware.

4.1. Former Soviet Union (FSU) Activities

The breakup of the Soviet Union created a changed world, as exemplified in President Bush's speech of September, 1991, where he pledged U.S. technical cooperation in nuclear-weapon safety and security. Congress supported this initiative with legislation that provided funds for the DOE laboratories to develop collaborative arrangements with weapon laboratories of the former Soviet Union to encourage stabilization of those institutions in peaceful technical work. The urgent nonproliferation concerns brought about by the breakup and the U.S. desire to support a fragile, emerging, free-marked economy led to requests for Sandia and other DOE laboratories to use our technical expertise to address these problems. Sandia's goals for cooperation with the former Soviet Union are to support U.S. Government policy on nonproliferation, access high-quality FSU science and technology, support FSU stability and commercialization, build long-term professional relationships with FSU weapons scientists, and assist U.S. commercial interests to access FSU technology and to identify viable ventures. Sandia supports a range of cooperative measures, from interactions under government-to-government agreements to direct lab-to-lab contracts.

Safe and Secure Dismantlement Programs are funded by DoD under a government-to-government agreement and administered by the Defense Nuclear Agency (DNA). A $21.5 million project was completed recently with delivery to Russia of 125 rail car kits to upgrade the safety and security of cars used to transport nuclear weapons. Flexible armor blankets to protect weapons from small-arms fire were delivered in 1994. We have verbal and other evidence that they are in use to protect weapons being withdrawn from sites. Fissile material containers were designed and tested by Sandia to transport and store material from dismantled weapons. DNA has a production contract to provide 33,000 of these containers. Requirements for the 3.5 million-dollar design effort were based on International Atomic Energy Agency crush-and-burn standards for plutonium transport. Additionally, Sandia provided portable integrated video systems to support two-way, four-channel video communications between a command post and site of a nuclear or other emergency.

Recently, Sandia has provided analysis of physical protection and other issues for a proposed fissile materials storage facility in Russia, but a recent complete design change initiated in Russia has put this effort on indefinite hold. Present involvement is limited to attempts to assure compatibility of the Sandia designed containers with the new storage concept.

The Exchange in the Fields of Nuclear Weapon Safety and Security is a government-to-government agreement signed December 16, 1994, by Vice President Gore and Prime Minister Chernomyrdin. This program is expected to be a technical exchange, with the national laboratories providing technical leadership. Working groups will be formed in three technical areas: (1) enhanced safety and security of both nuclear warheads and material during dismantlement; (2) enhanced safety, security, and physical protection of nuclear warheads and their components through external means; and (3) technical assessment of open-source materials

regarding nuclear warhead design and recommendation for criteria. The first meeting of the coordinating group for this agreement occurred in February, 1995. A wide range of important safety and security topics were recommended for further collaborative work.

The Industrial Partnership Program is intended to provide a mechanism for Russian scientists to build careers in the civilian workplace. It makes use of the capabilities resident in DOE's national laboratories and makes new technologies available for commercialization by U.S. industry. Sandia presently has 59 projects with 35 participating institutions in the former Soviet Union for a total of $4,625,000 in contracts. In addition, three cooperative R&D agreements (CRADAs) with $1.2 million of DOE funds have been approved.

Material Protection Control and Accountability (MPC&A) projects are coordinated by a multi-laboratory steering committee. About $15 million is available in fiscal 1995 for upgrading material protection control and accountability in a program initiated by DOE Undersecretary Curtis. A joint plan is now being coordinated by the steering committee with its counterpart committee of MINATOM laboratories led by Arzamas-16 (VNIIEF). Sandia will supply physical protection technology and system design expertise for these efforts. Sandia has nearly completed contracts with the Kurchatov Institute for about $700,000 to provide physical protection for one nuclear facility at Kurchatov. This work was completed in a few months and is considered both a success and a learning experience for future security upgrade efforts in Russia. Follow-on activities to bring more of the nuclear material at Kurchatov under control are in the discussion stage. All our MPC&A work is intended to develop the necessary culture, design concepts, and infrastructure to allow the facilities, with some U.S. funding support, to take responsibility for and implement their own effective MPC&A systems.

The Surety Technology Exchange was initiated as a "jump-start" tri-laboratory program with Arzamas-16 (VNIIEF) and Chelyabinsk-70 (VNIITF) to collaborate on non-weapon surety topics. Four symposia have been completed:

- risk assessment and system response (at VNIITF)
- transportation safety and accident-resistant containers (at Sandia)
- hazardous waste management (at VNIIEF), and
- energetic materials (at Lawrence Livermore).

Many mutually beneficial topics for collaboration were identified, leading to about 40 contracts worth about $1.5 million at Sandia. These programs are funded by DOE Defense Programs and involve about one hundred Sandians and four hundred Russians. Individual relationships of trust have developed along with close scientific ties and worthwhile work.

Energy and Environment Projects include the TOPAZ space reactor project, supported by the New Mexico Alliance (Sandia, Los Alamos, and the University of New Mexico) and five international participants. Significant technical spin-offs are expected from the TOPAZ thermionic technology, including high-temperature metals and insulators. An example of an environmental project is the EnviroTRADE interactive system containing information on international environmental problems and environmental technologies. EnviroTRADE workstations have been installed at four Russian institutes.

Lab-to-lab projects are science-driven, small R&D collaborations that are closely coupled to Sandia projects. A broad range of science and technology is involved, including nuclear power safety, environmental technologies, safety and risk assessment, innovative materials

development, lasers, pulsed power, medical technologies, nonproliferation research, manufacturing technologies, energy, computation, and basic science topics.

5. Maintaining Technical Leadership into the Next Century

It is a widely held view that the DOE national laboratories are national assets. Yet, these laboratories are the topic of considerable study and debate concerning their role in the post–cold war era and what changes in management or governance might be appropriate. Two recent reports that address these issues have undoubtedly come to your attention: *Alternative Futures for the Department of Energy National Laboratories* (the Galvin report) and *National Laboratories Need Clearer Missions and Better Management* (a GAO report).

A common theme in these studies is the importance of mission focus in the DOE laboratories. The technical challenges inherent in DOE's existing missions are formidable. But an extremely diverse array of core technical competencies and other capabilities covering the full spectrum of the science and engineering disciplines must be maintained at world-class levels if the laboratories are to perform their DOE missions consistently.

DOE's strategic plan for Defense Programs is designed to preserve the broad technology base required for national security missions. I support this strategic plan. I must emphasize, however, that the plan requires a multi-year commitment of funds, including substantial increases in the near term, to achieve its goals. It anticipates a substantial investment for the next several years to achieve a laboratory and production complex that will perform the Defense Programs missions at significantly less cost than the current enterprise.

The nuclear-weapon R&D program is the historical source of support for the technical foundations of the Defense Programs laboratories. It has become clear, however, that these funds will not be sufficient to sustain technical foundations and strategic initiatives at the level that will required for DOE missions. Therefore, it is essential to supplement this support with funds-in from other DOE programs and appropriate work for other federal agencies (primarily the Department of Defense).

Both the Galvin and GAO studies emphasize the importance of a more disciplined mission focus in the DOE laboratories. I do not disagree with their observation. But we must take care that greater mission differentiation among the DOE laboratories not lead away from the multiprogram concept toward single-mission laboratories. The multiprogram, multidisciplinary environment is absolutely essential for excellence in most of DOE's missions. The synergy that exists in a multiprogram environment enhances mission performance.

The multiprogram environment is also essential for attracting top technical talent to the laboratories. Young scientists and engineers want to look forward to interesting careers that offer the opportunity for a variety of challenges. They do not want to be constrained within a very narrow mission focus for thirty or forty years. This is especially true for the DOE national security mission. It will be very difficult to recruit top talent into the nuclear-weapon program if multiprogram opportunities are not available. Bear in mind that a major rebuild of the weapons in stockpile will be required in about fifteen to twenty years, and most of our current nuclear-weapon engineers will have retired by then. Consequently, recruitment is of vital concern.

5.1. Health and Status of the Laboratory

Sandia today is a strong institution that continues to make outstanding contributions to our nation's security, prosperity, and well-being. Management at Sandia understands that conditions

have changed and that adjustments in how we conduct business are required. In fact, we have been making substantial changes during the last five years to anticipate and accommodate these evolving conditions.

However, some trends are more worrisome than others because we have little management control over them and they may have strategic implications for the heath and capability of the laboratory. Foremost among these trends is the continuing decline in nuclear-weapon R&D program funding that I alluded to previously. This program is the foundation of our capability in all nuclear-weapon-related competencies required for our mission. While it is true that no new nuclear weapons are being developed, it does not follow that the foundational funding for that capability should diminish proportionately. Moreover, I believe that I have amply illustrated the diverse technical activities associated with the ongoing stewardship of the nuclear-weapon stockpile and its supporting infrastructure.

Engineering and production processes must be allowed to evolve and to be restructured to meet future stockpile needs. In the past, we maintained the assets needed for nuclear deterrence by continuously working on new system designs, meeting ever more challenging system requirements, supporting a steady production schedule, conducting full system tests, and predictably retiring and replacing old systems. This approach, based on the steady flow of a high-capacity nuclear-weapon program, maintained and enhanced the infrastructure and human assets that produced deterrence.

We now need to find another way to maintain and enhance these critical human assets. In the future, deterring another arms race will increasingly be a function of the perceived capability of our nation to respond rapidly and convincingly to new challenges involving nuclear weapons. If that capability is vitiated, we may be vulnerable to a new nuclear challenge in the future, as our stockpile ages and our design talent retires.

Sandia's employment level has not changed dramatically in the last decade. We ended FY 1994 with nearly 8,500 personnel, up from nearly 8,200 in FY 1984. However, the number of direct technical personnel supported by nuclear-weapon R&D program funds during this time declined by one-third (from 1,500 to 1,000). This is the core program that feeds experienced talent to all other national security programs at the laboratory.

The morale of our staff is fair. People understand that other sectors of the defense community have been hit much harder than we have. However, anxiety exists regarding the future of the weapons program, the health and well-being of the laboratory, and the long-term employment picture.

5.2. The Need for Industry-Laboratory Collaboration

The technology bases for government and commercial needs are rapidly converging. I am firmly convinced that collaboration with industry and universities is essential for the DOE laboratories' mission success. While mutually beneficial collaboration with individual companies will continue to play a significant role, increasing emphasis should be placed on generic, precompetitive research and development that can be broadly useful for an entire industry. Technical assistance by DOE laboratories to small and medium-sized companies is also a responsible way to increase the return on the federal investment in DOE's technical assets to the taxpaying public at minimal incremental cost.

Benefit to the weapons program from collaborative activities can be classified in at least three ways:

1. Weapons program activities addressing current stockpile needs coincide with private sector interests.

In these cases, the weapons program can benefit substantially from working cooperatively with industry as a result of the leverage provided by the partner's in-kind contributions to the project, the cost-free access to specific partner capabilities, the expanded reliability that results from partner-testing of components or materials, and the development and maintenance of commercial suppliers for defense programs product needs.

One technology area that fits in this category is environmentally conscious manufacturing (ECM). Our cooperative R&D projects in ECM involve co-development of processing technologies that minimize the generation of wastes at the source, systems integration of environmental design factors (including life-cycle design, materials recycling, and value-impact assessments), instrumentation for environmental monitoring in production facilities, and development of nonintrusive process diagnostics and controls.

One specific example of benefit to DOE is our program to co-develop, through collaboration with the private sector, lead-free materials and procedures for use in the assembly of nuclear-weapon components. Health risks and environmental damage associated with lead-derived solders and fabrication processes that utilize lead have prompted efforts to curtail the use of such materials in the weapons complex and in private industry. Joint evaluation by Sandia and AT&T was made of commercial lead-free solders as well as a new alloy developed by Sandia. The project currently focuses on applications of lead-free solders in nuclear-weapon components, including surface-mount operations on a clock board and hand-soldering processes on a firing-set board.

There is a strong push in industry to develop the capability for cost-effective, small-lot manufacturing of tailored products. The term for this is agile manufacturing, and it corresponds exactly with DOE's vision of a smaller nuclear-weapon production complex that can perform small-lot, high-technology fabrication cost-effectively. DOE cannot achieve this vision by itself; it must learn from industry—and develop with industry—the advances in manufacturing engineering that will be required to realize this vision.

2. Cooperative work with industry supports technology base capabilities or core competencies that address weapons programs needs on the 3–10 year horizon.

A specific example of this type of benefit to the weapons program involves co-development of practical optoelectronic technologies with industry. Optoelectronic components offer strong advantages over electronic components in terms of immunity from electrical noise and static discharges (including, for example, a lightning strike), freedom from interference, and directionality. This technology can directly impact a variety of weapons program needs in the 3–10 year time frame, including:

- Optical firesets and optical transmission of energy
- Ring-laser gyroscopes
- Detectors and modulators for wide-area networks for secure communications within the nuclear-weapons complex
- Non-invasive interrogation for weapons surety and state-of-health monitoring

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Sandia is a leader in the pursuit of photonic integrated circuits. Our basic materials competency in strained layer semiconductors led to several pioneering applications in optical detection and light-wave modulation. A CRADA between Sandia and Hewlett Packard on advanced manufacturing techniques for optoelectronics is further developing this strained-layer technology with one of the United States' few optoelectronics manufacturers. National security programs will benefit from having a domestic source for this critical defense technology.

3. Cooperative work with industry on carefully selected civilian or defense projects exercises key nuclear-weapon competencies that must be maintained but are critically underutilized because of the lack of new weapon development.

Cooperative projects of this sort help ensure that the weapons engineering skills and design judgment of our staff remain up-to-par to meet future needs. Weapon engineering skills cannot be maintained through simulated design exercises alone. Engineers must work with real designs for real products to keep their skills sharp. Collaborative design of components for civilian or defense systems can provide useful experience. Moreover, the laboratories must offer challenging, dual-benefit, scientific and engineering assignments if it hopes to recruit the best technical talent to support national security programs.

Sandia has for many years worked as a partner with industry on DoD programs that can benefit from unique nuclear-weapon-related technologies. Such nonnuclear defense work exercises the applied engineering skills that underlie nuclear-weapon competency.

More recently, commercial-sector projects are helping maintain these unique skills. For example, about three years ago, we became concerned that our world-class parachute technology group was approaching a critically low level to meet potential weapons program needs. High-performance parachutes are critical components of several DOE and DoD weapon systems. They directly affect the performance, mission effectiveness, and reliability of the weapon and are vital to the survivability of the delivering aircraft. We have been fortunate, recently, to partner with an industrial entity that can apply these essential parachute design skills to a commercial product. This collaboration has helped the weapons program maintain a critical skill. It has also helped U.S. industry achieve a leadership position in a technology with a substantial commercial potential. In my view, this is an example of the kind of collaborative work with industry that is necessary and appropriate for the DOE national laboratories. This CRADA and others like it were partially funded by the DOE Defense Programs Technology Transfer Initiative (TTI). The TTI serves a very important function by making such mutually beneficial collaborations possible. Loss or major redirection of this source of funding would seriously damage our ability to carry out our weapon-program responsibilities.

5.3. Laboratory Governance

The Galvin Task Force makes a bold recommendation to convert the governance of the DOE laboratories to a new basis. The Task Force believes that the GOCO (government-owned, contractor-operated) concept, the model on which the laboratories have operated for the last fifty years, has been irretrievably weakened through unrestrained growth in government micro-management, rule-making, and oversight, and they discount the department's ability to revitalize it. Only through de-federalization will the laboratories be able to operate with the efficiency and flexibility found in the private sector, in their view.

The Galvin report would create a not-for-profit R&D corporation to manage the laboratories under a board of trustees appointed by the President (staggered terms). Congress would provide

multi-year block-funding and the corporation would allocate these funds to the laboratories, with DOE functioning as the government sponsor of the corporation and the laboratories.

The rationale for such a radical change in governance is based on the belief that, unless something is done to buffer the laboratories from the DOE bureaucracy, the inevitable tendency of bureaucrats to "micromanage" will continue to dominate. Moreover, having a board consisting *"primarily of distinguished scientists and engineers and experienced senior executives from U.S. industry"* would tend to insulate the laboratories from partisan politics and provide a measure of stability.

Such a "clean sheet of paper" approach is well-intentioned and, in principle, could offer many advantages. Nonetheless, as proposed, it does not seem to me either practical in the near term nor sustainable over the long term. The principal weakness of this governance model is its elimination of a strong linkage between the laboratories and an agency of the executive branch. For the nuclear-weapons laboratories, such linkage is clear: We have a primary mission responsibility to the DOE Assistant Secretary for Defense Programs. In the absence of such linkage, the ability of the laboratories (in the role of FFRDCs) to assist DOE in program planning and management would diminish greatly. As a result, the laboratories would likely lose their mission focus.

I believe a more practical approach to addressing the root problems identified in the Galvin report would be to rejuvenate the GOCO relationship along the lines suggested by Appendix B of the report. In addition, a Laboratory Operating Board should be created, as presently being planned by DOE, which would incorporate many of the features of the Galvin model: distinguished leaders, staggered terms, and so forth. The board would also include senior DOE management along with the outside members, and be chaired by the Under Secretary. I believe that such an approach could achieve the benefits of the Galvin governance recommendations, provided it is embraced by senior management throughout the DOE complex.

6. Conclusion

Sandia National Laboratories has a central and critical role to fulfill in DOE's stockpile stewardship and management program. We must maintain confidence in stockpile safety and reliability and help DOE create an effective and efficient production complex for the smaller stockpile of the future. We must offer the technical vision and engineering leadership to provide for long-range support of the enduring stockpile as it ages and as old technologies are superseded by new ones. In addition, we must furnish a robust core capability in the scientific and engineering disciplines required to respond to emerging and unforeseen challenges relating to nuclear weapons.

We vigorously support DOE's strategic vision and plan for Defense Programs through 2010. The ADAPT (Advanced Design and Production Technologies) and ASCI (Accelerated Strategic Computing Initiative) components of this strategic plan are formidable technical challenges that will engage Sandia in a major way. Our own planning as a laboratory, including support of these and other major initiatives contained in the Defense Programs plan, is predicated on Congressional support of the funding requirements of the DOE plan over a period of several years. A sustained, predictable investment, at a level above that of the immediate past, is essential if we are to stabilize the program and establish a sound, long-term infrastructure for stockpile support.

STATEMENT OF DR. BRUCE TARTER, DIRECTOR, LAWRENCE LIVERMORE, NATIONAL LABORATORY

Mr. HUNTER. Dr. Tarter, we appreciate you being with us, also.

Mr. TARTER. Thank you very much, Chairman Hunter, Mr. Dellums, Mr. Johnston.

I would also like to speak in very strong support of the fiscal year 1996 budget proposal, both by the defense programs, DOE, and binational security.

I would like to pick up on a point made by Vic Reis this morning, which I think is a very essential one, that this year's budget proposal represents a dollar increase, but I think Vic said it right. It isn't just the dollar increase which is the important thing. It is reflecting, I think, the comments Al made at the end of his remarks, that it represents the beginning in our minds, long-term commitment to the stockpile stewardship program. And in that sense, I think it is as important symbolically as are the actual dollars that come with it. To my mind this year is a pivotal year.

Let me depart a little bit from the method other people have used and make an observation of my own. I am not very experienced at this, so I should get some free-ranging space. I believe very firmly the laboratories are not policy organizations. They are technical organizations. So what I want to do in just a few moments is try to describe to you the technical sense of members of the laboratory over the past several years, and in some way, their view of the future and how their role has changed.

If you go back through what I guess I would characterize as the beginning of the post-cold-war period, we all know what the facts have been. The budget has dropped, and to a large measure, we have done some degree of consolidation, but as Al indicated, much of this has been free-fall, simply collapsing each of the relative facilities within the department.

I think this year, the program that is put together tries to bring some degree of coherence into the future. But let me take a life of a particular individual at the laboratory and try again to describe what his view of the world has been.

For many, many of the past years that individual has spent his life doing things like designing ideas—having ideas for weapons, designing weapons, testing prototypes for weapons, testing real weapons, and then following through their cycle in the stockpile.

As of a few years ago, when we stopped testing and stopped production, we have now truncated the first part of that cycle. We no longer design weapons. We no longer test weapons. We no longer go through the first part.

What we now have, and I think both Under Secretary Curtis and Dr. Reis tried to capture it this morning, is a very different view of how we manage that stockpile without that first half of the cycle. And that to my mind has three pieces, which have been brought out, but I will say them perhaps a little differently.

One of them speaks to Mr. Dellums' comment this morning. The first part of this is a very aggressive surveillance, and I will call it the archiving program. We are now engaged, since we are going to look at weapons which are going to go through an extended lifetime, along with the old stockpile fashioned, a much more aging

phenomena, so we need a much more aggressive surveillance program.

It is also characteristic of the way scientists work, that as long as new things are coming, they don't go back and look at the old things very carefully. One of the ways of testing new ideas is to test new methods against all the old data. That is the first part of this new, central, overall stockpile management stewardship program.

The second part I think Dr. Narath has referred to, which is a manufacturing program, which no longer produces the batch runs of weapons, but which does allow us over a period of 10 or 20 years to do limited production of parts, components, and full weapons, but in a very different way than we did in the past. As he indicated, that is likely to happen at a new site or to some degree at one of the laboratories.

The third piece, which is the one in which Livermore and Los Alamos have had a great deal of focus in the past, is on assuring the reliability and safety of the pieces and the members of the stockpile.

In the past, and I won't try at this moment to get into the arguments this morning about whether testing or science is the best way, but testing was the arbiter. We could have disagreements, we could argue, and if we could test it, more or less that gave us an answer.

We have acted under the assumption that it is no longer going to be feasible. So what the stewardship program tries to lay out is the best possible way of doing that.

We have at each laboratory a set of facilities which do a reasonable job of the above-ground experiments and calculations that were done to support the testing program. To do the program in the absence of testing takes much stronger and more robust above-ground capabilities. That is why your program has before you proposals for things like the dark facility at Los Alamos, the National Ignition Facility at Livermore, and a very strong emphasis on the advanced computing part.

I think each of those three facilities, which speaks to a different part of the weapons cycle, is essential if we are going to have a stewardship program which will provide confidence over the very, very long term.

I will speak to each of those later, if anyone wants to ask questions. But I think the package is essential, to do a nontesting, responsible job of stewardship.

Let me speak just for a moment to the comparable changes in the area of nonproliferation and national security, because in my own mind that world changed as dramatically as did that of actually doing the design, development and testing of weapons.

After the cold war, and I think Chairman Hunter spent a great deal of focus and emphasis on this this morning, before the cold war ended, there was basically the concern, I think, about proliferation in Third World countries, of those weapons proliferating.

With the dissolution of the former Soviet Union, we now have this additional threat, which I will characterize as materials leaving the Soviet Union, smuggling, terrorist, a whole new set of kind of phenomena which create nuclear danger in the world. So we

have two kinds of worries in a nonproliferation world, one, countries building their own programs, and either terrorists or nations which simply want to take materials or weapons and use them for some malevolent purpose.

The program which Mr. Baker outlined this morning and the ones done at the laboratories speak to both those kinds of threats. They are a complicated set of activities. I think in the case—and I should say, each of us has some special technical capabilities we have developed to try to meet each of the various pieces of that cycle.

In the area of the proliferant countries, I think Livermore, for example, has had a strong, long-term lead in the intelligence aspect of saying what the world's other countries are doing in those areas.

I think we have also in concert and during joint programs with our sister laboratories and other laboratories, are developing techniques such as laser sensing and other sensing techniques to try to detect the signatures of countries which are trying to build programs.

We are also working with the Department of Defense to see if those new technologies allow us to also make some contributions to the biological and chemical warfare detection mechanisms. So those I think are—it is a long-term program which we have put increasing emphasis through the growth of technology.

In the case of the materials accountability, which I think you spent so much time on, Secretary Curtis made such a strong emphasis, I think that is at the heart of the issue of security, as you all emphasized this morning. I think Los Alamos, as Secretary Curtis cited, has taken a strong lead.

There is active participation by the rest of the laboratories. I think Livermore is focused very strongly at the moment on what happens after material may have left the initial source, sort of the smuggling area, the area of trafficking.

We also are involved with a new forensics center which tries, if you find illicit material, to trace back the origins through forensic analysis. That is a robust technique which has application in law enforcement and related technologies.

Finally, we have devoted a good deal of effort in the last several years to technologies which will disable nuclear weapons, which can detect nuclear weapons. Those are all very difficult things.

Conventional explosives are not easy to render safe and they are not easy to find. Nuclear devices are not easy, but it is worth of effort to inhibit that. We have put a lot of our internal focus on those areas.

Let me close with comments somewhat similar to those of Dr. Narath. I think there are many groups that have had input into the long-term program of—let me call to the integrated nuclear weapons perspective in the country.

I think you have statements, and if you don't, I can provide them on the record, from the University of California Oversight Committee which oversees both Los Alamos and Livermore, which has spent the better part of 3 years in a detailed analysis of many of the issues which come before your committee.

There are many other groups who have also provided that input. The one thing—there are disagreements in substance among all of

those different groups on various issues. But the one thing they all agree upon is the strongest hedge over the long term is the quality of the people who do the work. And I think Mr. Skelton this morning raised that question.

So whatever program we set up, it has to have two things: It has to have a challenge, because in some sense, these laboratories are at the best when the people feel they are making a major contribution to the national will, to the national welfare, to doing something which helps the country a great deal.

They also have to be technically challenged. And again, to reinforce what Dr. Narath has said, they need to feel some sense of bipartisan, administrative and congressional support and commitment for the long term. I think that is an essential ingredient.

Let me make one last observation which I actually had on the plane yesterday. And it is a good thing, because I wouldn't write it down, even for my own laboratory.

I joined Livermore about 25 or 26 years ago, and I came in as basically—I certainly had no particular background, obviously, in doing weapons. I did basically high-energy astrophysics.

When I joined the laboratory, we were about 5 or 6 years into the atmospheric test ban, and it turned out that as one of the readiness measures of the atmospheric test ban, we had a group doing x-ray astronomy. I found that group to be a wonderful thing to work with. I wrote papers. We had just a wonderful time doing x-ray astronomy. But we didn't do a thing about weapons.

So I think one observation I had on the plane yesterday, which I think somehow has to be built into this process, is that if we are going to really exist with a robust capability in this as long-term era, I think we have to manage very carefully how we do this work.

We can't simply let it exist as scientific things with bombs as the deliverables at the end. The confidence comes from having people who understand how the science gets back into the confidence in the stockpile.

It is also, I think, to my mind, one of the strongest reasons why you do need independent judgments in making most of these decisions in an era in which testing doesn't exist.

I think those comments were made about the separation of the Department of Defense, Department of Energy, for independent judgments. In my own view, they are equally valid among the laboratories, that we need some way of making those independent judgments. And I believe until we have gone a fair ways down this road of nontesting, that preserving that capability is crucial.

Thank you very much.

Mr. HUNTER. Thank you.

THE DEPARTMENT OF ENERGY'S BUDGET REQUEST FOR FY 1996

Hearing of the Subcommittee on Military Procurement
National Security Committee
US House of Representatives

March 29, 1995

C. Bruce Tarter, Director
University of California
Lawrence Livermore National Laboratory

Introduction

I am the Director of the Lawrence Livermore National Laboratory (LLNL). We were founded in 1952 as a nuclear weapons laboratory, and national security continues to be our core mission. In addition, we have major programs in energy, environment, and biosciences. Our permanent staff numbers approximately 7300, with over 1000 Ph.D.'s distributed over a broad range of disciplines in the physical sciences and engineering.

I am here today to support the FY 1996 budget submission by DOE Defense Programs to pursue its Stockpile Stewardship and Management Plan. The program plans are cost conscious, take maximal advantage of the special capabilities at each of the three national security laboratories, and begin to make necessary investments in the tools needed for assessment and certification of the stockpile without nuclear testing. These investments include the National Ignition Facility and the Accelerated Strategic Computing Initiative, which are of particular significance to LLNL. I also support the budget submission by the DOE Office of Nonproliferation and National Security, which sponsors our important contributions in the areas of nonproliferation, arms control, and intelligence analysis.

Background

During the Cold War the nuclear weapons complex consisted of ten production sites, the Nevada Test Site, and three research and development laboratories: Lawrence Livermore, Los Alamos, and Sandia. This complex developed, tested, and ultimately produced a stockpile of 30,000 weapons deployed on many different types of military deliver systems. The laboratories' role was to design, develop, and test nuclear weapon designs to meet military requirements and to be manufactured at the production sites. In addition, the laboratories maintained surveillance over weapons in the stockpile from production through dismantlement, assessed any safety or performance issues that arose, and recommended appropriate remedial measures. Most of the investment in the complex was in facilities and programs for the manufacture of weapons and for the production of the special nuclear materials and tritium needed in weapons.

During the last five years, which marked the beginning of the post-Cold War period, this set of activities has undergone dramatic changes. Under the START I and START II agreements the United States will reduce its nuclear weapons stockpile by nearly 80% by early in the next century. Most of the production sites in the complex will no longer be needed, the enduring stockpile will be reduced to just eight weapon types, and it will be necessary to develop the technical capability to provide confidence in the stockpile without nuclear testing. And, with rare exceptions, the people who will manage the stockpile in the next century will do so without the benefit of having designed or tested a nuclear weapon for the stockpile.

Driven largely by financial pressures—the budget for the weapons program has been cut to less than half of that at the end of the Cold War—the system downsized rapidly and without clear long-term direction. That changed completely over the past 18 months through integrated planning in the Department of Energy (DOE) to create a Stockpile Stewardship and Management Plan that will take us well into the next century. In addition, the level of the Department's efforts directed at stemming nuclear

proliferation increased, and important new initiatives such as the counterproliferation program in Department of Defense (DoD) were begun.

As a starting point for this post-Cold War plan, the DoD's recent Nuclear Posture Review reaffirmed the importance of nuclear weapons for the security of the United States and set the requirements for the DOE. In addition, Congress and the Administration provided an overlying set of fiscal realities that put strong constraints on the way in which DOE could do its job. Our principal mission responsibilities in this new world are:

- *To ensure the safety, security and reliability of the nuclear weapons stockpile.* During the Cold War, modernization programs limited stockpile aging, and nuclear testing assured weapon performance. Now, no new nuclear weapons are being designed or produced, and nuclear testing is not an option for validating the performance of aging weapons. The President has directed us to find new ways to retain confidence in the nuclear deterrent.

- *To provide expertise and technology to support arms control policy development, arms control verification, and intelligence assessments of nuclear weapons activities worldwide.* During the Cold War, the emphasis was on policy support and verification of bilateral arms control. Now, the danger of nuclear proliferation is of growing importance. The laboratories are being called upon to support burgeoning efforts on transparency and confidence-building measures, nuclear materials monitoring and control, and detection of and measures to prevent nuclear proliferation.

Both of these national security mission responsibilities are technically demanding and require husbandry of the scientific and engineering excellence at the laboratories that the nation has relied on throughout the nuclear age. I will discuss each of these two mission responsibilities in turn, with a focus on the new elements of the national plan and a description of Livermore's role. I will close with a short summary, emphasizing those aspects of the program that are particularly vital to the health of and morale at the Laboratory.

Stockpile Stewardship and Management

The DOE Stockpile Stewardship and Management Plan

The Assistant Secretary for Defense Programs has led the Department, its three national security laboratories, and other sites in the weapons complex, in the development of the DOE Stockpile Stewardship and Management Plan. This long-term plan is a roadmap based on the requirements set forth by the DoD and reflects stringent fiscal realities.

The Stockpile Stewardship and Management Plan calls for radical changes in the way we do business, both to cut costs and to adjust to new circumstances: fewer weapons, fewer types of weapons, no production of new types of weapons, an aging stockpile, and no nuclear testing. It is organized around three major elements to support a small stockpile of weapons:

- *An enhanced surveillance program to understand and predict the effects of aging.* An enhanced surveillance program includes efforts to develop a modern nonnuclear experimental data base for stockpiled weapons and to make archival data more accessible and useful to stockpile stewards. It requires an expansion of current surveillance efforts, an active preventive maintenance program, a focused archival program, and strong supporting capabilities in physics, engineering, and chemistry and materials science.

- *A small, efficient manufacturing capability to refurbish and replace aging and defective components.* Since specific problems that may arise in warheads are difficult to predict, the production facilities of the future must be agile and highly capable, yet affordable. Choices of production technologies will emphasize flexibility and will utilize modern commercial methods wherever possible. Because the stockpile of the future will be much smaller, the focus will be on capability, not capacity.

- *A revalidation process—backed by a set of new experimental tools—to support high-confidence assessment and certification when issues about stockpile performance occur.* The technical staff at the national security laboratories will need to establish a revalidation process based on

independent evaluations and judgments to ensure quality control. As the scientific underpinning of this process, they will have to rely on numerical simulation with advanced computer models and above-ground nonnuclear testing in more sophisticated experimental facilities. Science-based stewardship will have replaced nuclear testing as the means to assure confidence in the stockpile.

DOE's overall plan, which is still being developed, envisions a much smaller overall complex, operating in a more integrated fashion and drawing on the unique strengths of each site. The goal is to cut costs while preserving required capabilities. It will take over a decade to make the transformation to the very different configuration attuned to the needs of the post-Cold War world. It is anticipated that the three laboratories will take on a more challenging and diverse set of long-term roles as the production complex is further reduced.

Much consolidation has already occurred to achieve a leaner program. We have eliminated unnecessarily redundant facilities and capabilities amongst the laboratories. As further steps to consolidate are taken as part of the plan, necessary capabilities and skills must be preserved, in part by making efficient use of existing investments in facilities and people. For example, I anticipate the process will eventually lead to closing the plutonium facility at LLNL at an annual savings of $10 million but a cost of perhaps $65 million for decontamination and decommissioning. It is incumbent on all of the laboratories to seek further consolidation consistent with the needs of the program.

The LLNL role in the Stockpile Stewardship and Management Plan

LLNL has worked closely with Defense Programs to develop the DOE Stockpile Stewardship and Management Plan, and we are highly supportive of their efforts to create the necessary scientific basis for stewardship in an era of no nuclear testing. We also agree with their efforts to manage the laboratories as a "diversified research system"—as recommended by the recent US General Accounting Office report *National Laboratories Need Clearer Missions and Better Management*. Livermore's core nuclear weapons

program is a factor of two smaller than it was at the end of the Cold War. However, as a leaner element of the integrated program, we have sharpened our focus. We have preserved the core competencies necessary to support our broad national security mission, attend to LLNL-developed weapons in the stockpile or being dismantled, and operate several special user facilities. These include the High Explosives Applications Facility (HEAF), the Nova laser facility, and the Flash X-Ray facility at Site 300. In addition, we operate a number of smaller science and engineering facilities that provide unique capabilities to the program.

Stockpile Responsibilities. Dismantlement, which will continue past the end of the decade, involves many systems for which Livermore retains technical responsibility. In particular, dismantlement of the W48 and W79 artillery projectiles, the W55 SUBROC, the W56 and W62 ICBM warheads, the W68 SLBM warheads, and the W71 ABM warheads require significant attention to ensure safe and timely dismantlement and disposition of excess materials.

Livermore's responsibilities for the enduring stockpile include the B83 bomb, the W84 cruise missile and the W87 ICBM warhead. These are the only systems in the inventory with all the modern safety features, and they are expected to endure past their originally anticipated lifetimes. Significant effort is being expended on the surveillance, maintenance, and selective refurbishment of these systems.

As part of our archiving program, we are paying particular attention to these stockpile systems. In addition to archiving past data, we are developing a modern experimental database and computational understanding. Many of the nonnuclear experiments on the systems were done 10-15 years ago. Today, much better techniques are available: penetrating radiography with enhanced sensitivity from a gamma-ray camera, high speed laser illuminated photography, and multi-beam Fabry-Perot velocity measurements. These new data and the understanding which results will form the basis of a joint LLNL/LANL revalidation of the safety, security and reliability of these important systems.

Surveillance. We are also working to improve the "science" of enhanced surveillance so that we can better understand and predict the effects of aging on weapons. These efforts are the key to an affordable manufacturing capability because they enable a more systematic refurbishment and "preventative maintenance" program rather than an expensive and high-production-rate replacement program when aging effects are found. Livermore is in the process of establishing an enhanced materials database (using surveillance and dismantlement data) and developing sophisticated computational techniques to better analyze these data. In addition, we are applying advanced techniques like scanning tunneling microscopes (STM) and atomic force microscopes (AFM) to look at the effects of corrosion on an atomistic level. Other advanced sensors and non-destructive techniques will attempt to evaluate weapon components in a more detailed and fundamental way.

Manufacturing. LLNL is working on several technologies to provide cost effective manufacturing capability to replace and refurbish aging weapon components. We are responsible for developing a pit-reuse capability which would permit the reuse of old plutonium components if necessary to fix a problem in the stockpile. In addition, we are developing a precision casting process for plutonium. It would significantly reduce costs and the waste generated. This process, which would be transferred to LANL for full implementation, can be applied to rebuild pits destroyed in the current surveillance program. We are also developing precision casting and spin-forming techniques to replace the current methods of rebuilding uranium parts destroyed in the surveillance program. These efforts draw on the uranium capability developed in the LLNL Uranium AVLIS program.

We are also making effective of use of Defense Programs' Technology Transfer Program to pursue technologies and capabilities needed for nuclear weapons manufacturing with industry. Our laser technology development with the US auto industry, for example, is directly relevant to the welding, drilling, and trimming technologies required for production of special-nuclear-materials parts with minimum waste generation. Other efforts are

aimed at improved nondestructive evaluation, reduced waste in manufacturing, better quality control, and more reliable microelectronics.

Science-Based Assessment and Certification. Decisions about the stockpile must be grounded in experimental reality and simulated successfully by detailed computer models. At LLNL we operate state-of-the-art experimental facilities for the integrated complex, including the High Explosives Applications Facility (HEAF), the Flash X-Ray facility at Site 300, and the Nova laser system. Additional tools are needed because the technical staff will not be able to rely on nuclear testing in the future. They will have to understand the *science* of nuclear weapon performance to assure the safety, security, and reliability of the enduring nuclear stockpile.

The FY 1996 Defense Programs budget submission includes three new initiatives that are very important to Livermore. These are the National Ignition Facility, the Accelerated Strategic Computing Initiative, and the Contained Firing Facility.

The National Ignition Facility

The National Ignition Facility (NIF) is identified by Victor Reis as being "the most important new facility" in the Defense Programs budget request for FY 1996. A total of $61 million is requested for the NIF for Title I design activities and related operating expenses. The NIF is a cornerstone of the science-based stockpile stewardship program. It is the only facility that will permit well-diagnosed experiments pertinent to fusion and high-energy-density physics processes which occur after the high explosive is detonated. The NIF is also the critical next step in the development of Inertial Confinement Fusion (ICF) as an environmentally attractive energy source, and it will serve as a user facility for a wide range of fundamental scientific research.

The NIF will consist of the laser system and optical components, a target chamber, and computer control system all in an environmentally controlled building. The laser, consisting of 192 beams to deliver 1.8 million joules and "ignite" small fusion targets, will be the world's largest optical instrument. Its construction will allow America to retain world leadership in ICF. It will

advance US high technology industries such as those in optics, lasers, materials, high-speed instrumentation, semiconductors, and precision manufacturing. Because of this impact, the NIF has been endorsed by every major laser and optics industrial organization. If there are no delays, system startup will be in late 2002.

A laser ignition facility was strongly recommended by the National Academy of Sciences and the DOE Fusion Policy Advisory Committee in their 1990 reports. More recently, the DOE ICF Advisory Committee and the JASON Review Committee, a prestigious academic-based DoD scientific advisory panel, endorsed the NIF. In their July 1994 report, the JASONs said that "The NIF is without question the most scientifically valuable of the programs proposed for the science-based stockpile stewardship program." The NIF was also endorsed by the Galvin Task Force.

In October 1994, Secretary O'Leary announced her approval of Key Decision 1 for the NIF. This followed completion of the Conceptual Design Report in April 1994 and the successful demonstration of Beamlet (a full-scale prototype of a NIF beam). Secretary O'Leary also established a Key Decision 1 Prime process whose goal is to evaluate the consistency of the facility with US arms control and nonproliferation objectives. This is to be completed by August 1995.

I expect the Key Decision 1 Prime outcome to be positive because the pursuit of ICF is very international—including a substantial effort in Japan—and should have no impact on extension of the Nuclear Nonproliferation Treaty or establishment of a Comprehensive Nuclear Test Ban. The key physical concepts are unclassified and much of the research at the Nova ICF facility at Livermore is conducted in the open with participation by scientists from throughout the world. The NIF will be an even stronger draw for international research projects.

As a user facility the NIF will support research on:

- National Security. The NIF will provide access to physics regimes of interest in nuclear weapons. Scientists from all the national security

laboratories will be able to obtain nuclear-weapon-related physics data, particularly in the area of fusion and the high-energy-density physics which occurs after the high explosive is detonated for comparison with advanced numerical simulations. These include high-quality opacity data for partially ionized materials, valuable information about the mixing of layers of different materials during implosion, and data that can help us assess the impact of cracks and other abnormalities on weapon performance. The NIF will not enable LLNL or LANL to design new weapons *per se*, but it will help us evaluate issues for existing designs and improve and test computational models for those designs.

- Fusion Energy. The NIF is an essential element in the program for the development of inertial fusion energy for civilian power production. If net fusion energy gain is demonstrated, as anticipated, the NIF will constitute the crucial step towards the ultimate goal of providing energy security for the US in the 21st century.

- Science and Technology. The NIF will produce conditions in matter similar to those found at the center of the sun and other stars. New, well-characterized, high-energy-density regimes will be routinely accessible in the laboratory for the first time. The NIF will advance scientific and technical fields such as astrophysical sciences, plasma physics, atomic and radiative physics, hydrodynamics, materials science, advanced coherent and incoherent x-ray sources, nonlinear optics, and computational physics. Scientific progress in those fields will, in turn, provide enhanced understanding of the physical conditions in nuclear weapons.

The NIF should also be a very productive laboratory for new technology. To date, there have been 26 *R&D 100 Awards* bestowed upon researchers at ICF laboratories, including three last year to LLNL staff. In addition, the Laser Program at LLNL has 24 Cooperative Research and Development Agreements (CRADAs) with industrial partners, totaling over $160 million. Optical technology developed for the ICF program enabled a California firm to provide corrective optics for the Hubble telescope, and

"radar-on-a-chip" technology developed in the program this year appears to have many revolutionary applications.

Because multiple benefits will derive from a vigorous ICF program in the coming decades, the NIF will attract talented scientists and engineers to contribute to stockpile stewardship. As evidence, one needs to look no further than this month's news. Two researchers at LLNL, Michael Campbell and John Lindl, just received the E.O. Lawrence Award for their distinguished leadership in laser-driven ICF—theoretical, computational, and experimental. World-class facilities clearly attract world-class scientists.

The need for the NIF is independent of any siting decisions. However, Secretary O'Leary has voiced her preference for Livermore. LLNL is the natural siting choice because of the large contribution we have made to the advancement of ICF and the development of the laser system to be part of the NIF. LLNL has built six large laser systems since 1974 and each has been completed on budget and performed as designed. The facility would greatly benefit from and contribute to LLNL's existing unique capabilities in lasers, and the NIF would play a key role in the future evolution of the Laboratory.

The Accelerated Strategic Computing Initiative

The objective of the Accelerated Strategic Computing Initiative (ASCI) is to vastly improve the high-performance computing capability at the national security laboratories. Numerical simulation and computer models, benchmarked with historical nuclear test data and results from laboratory experiments, will be the principal tools for assuring stockpile performance in the future. In the absence of nuclear testing, we need more realism in the computer simulations—improved models of physical effects, greater resolution, and use of three spatial dimensions (no symmetries in the problem). To simulate more realistically all of the complex physical phenomena that occur in a nuclear weapon, we need over a thousand-fold increase in computer speed and data storage capacity.

Orders-of-magnitude improvement in capability requires computers with multiple processors working together to rapidly solve a single problem. The

use of a machine with more than 100 processors is called massively parallel processing (MPP). To date, massively parallel computing has not advanced as rapidly as it might because of the difficulty in creating efficient, high-performance parallel programs. Obstacles arise from deficiencies in computer (hardware) design and in the development of applications software. To advance the state of the art, the national security laboratories must work with the developers of MPP computers in a multi-year cooperative effort. In addition, information management systems, data storage systems, computer networks, and computer graphics systems all must be improved. These efforts comprise the ASCI, and $45 million in the Defense Programs FY 1996 budget submission supports this important initiative.

High-performance computing has always been central to scientific programs at Livermore so the ASCI is vital to our future. In addition to the classified Livermore Computer Center, LLNL is home for the National Energy Research Supercomputer Center (NERSC). Overall, nearly 10% of the Laboratory's annual budget is invested in the development of applications and systems software. We have acquired two MPP computers—a Meiko CS-2 and a CRAY T3D, and we are working on a prototype high-speed network which will interconnect LLNL and LANL to access the resources of both sites. There is a second CRAY T3D and a Thinking Machines Corporation CM-5 at LANL.

We are using the MPP computers to develop three dimensional simulations which include a wide range of structural, high explosive and plasma physics phenomena present in a nuclear device. These efforts require new numerical algorithms and programming techniques to efficiently use the capability of the new machines.

The ASCI is augmented by the Industrial Computing Initiative (ICI), a $52 million CRADA involving LLNL, LANL, and eight industrial partners. In the three-year ICI effort, computer applications originally created specifically for DOE programs will be transformed into efficient massively parallel models for use by US industry to improve productivity and competitiveness. Simultaneously the enhanced codes will be reintegrated into ongoing DOE

programs. Another CRADA that supports ASCI is the National Storage Laboratory, an effort based at LLNL's NERSC to research and commercialize technologies for high-performance computer storage of large amounts and diverse types of information.

The Contained Firing Facility at Site 300

Hydrodynamic testing is the only currently available way of experimentally testing the implosion phase of a nuclear detonation. These are critical experiments for understanding weapon safety, assessing the performance of weapon primaries, and evaluating the feasibility of approaches for safely disabling a nuclear device. The Defense Programs budget submission includes $16 million in FY 1996 for construction of the Dual-Axis Radiographic Hydrodynamic Test Facility (DARHT) at LANL and $6.6 million for enhancement of the Flash X-Ray facility (FXR) at LLNL's Site 300 to make it a Contained Firing Facility. Containment of the FXR test bed will preserve this important national capability and is a preventive measure to protect against future environmental restrictions.

The investment in the Contained Firing Facility is important because of uncertainties associated with future environmental restrictions and the near-term future of DARHT. Construction of DARHT has been halted by court action until completion of an environmental impact statement and the issuance of a record of decision by DOE. Until DARHT comes on line—Autumn of 1998 at the earliest—the FXR facility is the most capable hydrodynamic test facility in the world. It is the best diagnostic tool available for measuring integrated performance of nuclear weapon primaries by nonnuclear testing.

In addition, we are currently upgrading our flash x-radiography capability and making modest investments in the FXR accelerator. The development and use of a gamma-ray camera (replacing the use of film) provides greater sensitivity and resolution at modest cost. It paves the way for being able to obtain a time-sequenced set of images, which would be an important capability for a future more-advanced hydrodynamic test facility.

The Importance of Independent Evaluation

Stockpile assurance very critically depends on the process of validation and certification of weapons performance. In the past, validation and certification was greatly assisted by nuclear testing—the final arbiter. In the future it will depend on the judgment of personnel in the program supported by the nonnuclear testing they will be able to perform. It is not surprising that the Galvin Task Force identified "attracting and retaining skilled scientists, engineers, and managers over the years ahead" as the highest priority in stockpile stewardship. The assessments of these scientists must be folded into a management process that will make use of independent evaluations to provide the required confidence in the stockpile.

I strongly believe that such confidence in the performance of the US nuclear stockpile can only result from the independent judgments and evaluations provided by the expertise and capabilities of all of the laboratories. Assuring the safety and reliability of our nuclear deterrent in the absence of testing is a new and major challenge. We are heading into uncharted territory and should take full advantage of the knowledge and commitment of trained people at each of the laboratories.

Judgments about nuclear weapons issues are particularly complicated because of the uniqueness of the enterprise. For security reasons, only a small community of people have the necessary expertise and access to tools to deal with the intricate classified details of the modern nuclear weapons in the stockpile. In addition, many physics and engineering issues are special to the discipline, such as material properties at extreme pressures and temperatures. Furthermore, we will not have an accurate calibration on how well the new system is working until a few critical decisions have been made, and our customer, the Department of Defense, is satisfied with the results.

Sidney Drell (as Chairman of the National Security Panel of the University of California's President's Council on the National Laboratories) wrote:

> "Livermore's excellence is of great importance, in particular for peer review purposes, as we enter into a comprehensive test ban era and address new challenges to maintaining long-term confidence in the safety,

> reliability, and effectiveness of our stockpile. ...We believe there is a need for strong support to maintain LLNL's excellent design and diagnostic capabilities at this time. ...Gradual consolidation of the two laboratories' weapons activities is entirely appropriate with reduced stockpile needs, but we urge caution in assessing more fully their impact before taking specific actions lest we lose important peer review capabilities while they are still needed."

I strongly believe that we must carefully define the process that will be needed, recognizing that it will need to function effectively for the foreseeable future. And we must avoid irreversible decisions before the process is adequately tested.

Stemming the Proliferation of Nuclear Weapons and Other Weapons of Mass Destruction

The New Proliferation Danger

The nuclear dangers now facing the United States are more varied and complicated than they were a decade ago. Rather than the monolithic threat posed by the Soviet Union in a bi-polar world, we now must hedge against possible reversal of reform in Russia and address the increasingly serious threat of proliferation of nuclear weapons. President Clinton has stated "A critical priority for the United States is to stem the proliferation of nuclear weapons and other weapons of mass destruction and their missile delivery systems."

Proliferation can occur through indigenous development programs that draw on the increasing availability of nuclear technology and the continuing spread of nuclear expertise. Alternatively, nation-states or rogue subnational units, such as terrorists, can acquire nuclear capability through the theft and subsequent sale of fissile materials or weapons.

To deal with these dangers, we continue to rely on the deterrence provided by the US nuclear arsenal and work to preserve and strengthen the international nonproliferation regime. Stemming proliferation is a challenge to the diplomatic corps, the arms control community, the military, the intelligence community, and the developers of supporting technology. It requires a multifaceted effort by the US Government with activities and programs coordinated among the various agencies that shoulder nonproliferation responsibilities.

DOE and its laboratories provide expertise and technology to support arms control policy development, arms control verification, intelligence assessments of nuclear weapons activities worldwide, efforts to facilitate nuclear weapons dismantlement in Russia and fissile material control, and other nonproliferation and counterproliferation initiatives. In many of these areas, progress is constrained by funding and important milestones could be achieved earlier if additional resources were available.

LLNL Programs in Nonproliferation and Arms Control

I welcome the recognition by the Galvin Task Force that the DOE national security laboratories—and LLNL in particular—have a major, growing mission responsibility in the areas of nonproliferation, counterproliferation, verification and intelligence support. For over two decades, Livermore has played a leading role in detecting, characterizing, and countering proliferation activities worldwide. In recognition of this fact, DOE focused its proliferation intelligence activities at LLNL in 1977. Since then our Z-Division has been one of the principal suppliers of broad-based proliferation assessments for the intelligence community. Livermore's past and continuing significant contributions to nonproliferation and our base of nuclear weapons expertise make us especially well qualified to address this emerging threat.

Three years ago, we responded to growing concerns about proliferation by forming a new Directorate at LLNL—the Nonproliferation, Arms Control, and International Security (NAI) Directorate—to better utilize and coordinate the many relevant technical capabilities at the Laboratory. This summer we will co-locate the NAI and the Defense and Nuclear Technologies Directorates in a major new facility. These are synergistic programs and the move will enhance all of our national security efforts for DOE.

Our arms control and nonproliferation activities at LLNL are responsive to two troubling proliferation scenarios. In the first scenario, uncertain nuclear material control, combined with malevolent intent and diffusion of technical know-how, gives rise to a direct threat of terrorist groups or hostile nations smuggling nuclear devices into the United States. Because of the possibility of theft, purchase, or smuggling, political volatility in the former Soviet Union makes the large quantity of Russian-controlled nuclear material and weapons a concern. This threat is compounded by uncertain controls over the huge and growing amount of plutonium from civilian reactors worldwide.

Hence, there is a very real possibility that nuclear devices will be smuggled into the United States and detonated, or threatened to be detonated. Moreover, the prospect of terrorists fabricating a nuclear device from illicitly-

obtained kilogram-scale quantities of weapons-usable nuclear materials poses a serious threat. In Munich last August, police seized 350 g of plutonium arriving on a flight from Moscow. In December, Czech authorities intercepted a car transiting Prague with almost three kilograms of 88-percent enriched uranium hidden in its trunk. These incidents and others demonstrate that nuclear weapon materials are leaking out and being offered for sale.

In response to this first scenario, we are pursuing activities aimed at:

- *Reducing the exposure of nuclear materials and know-how worldwide.* Our principal activities relate to cooperative threat reduction in the Former Soviet Union, technical support to nuclear arms control negotiations, and technology development for treaty verification.

- *Countering nuclear smuggling* (because nuclear materials might be stolen). LLNL is responsible for operating the DOE Communicated Threat Credibility Center for tracking and evaluating nuclear smuggling incidents.

- *Responding to nuclear incidents* (because terrorists might obtain a nuclear device). LLNL is working on technologies to locate and render safe a terrorist nuclear device.

In the second scenario, proliferation of weapons of mass destruction through indigenous national programs leads to the possibility that such weapons may be considered for use by hostile third-world countries (e.g., North Korea, Iraq, and Iran) and in regions of uncertain stability (e.g., Pakistan-India, Israel-Middle East). How can we detect programs to develop such weapons, characterize their status, and effectively counter them?

In response to this second scenario, we are pursuing activities aimed at:

- *Stemming emerging international nuclear weapons capabilities.* LLNL is one of the principal suppliers of broad-based proliferation intelligence assessments. In addition, we support US activities in international arenas such as UNSCOM and the IAEA.

- *Developing effective detection technologies* (to provide necessary technical capability to assess foreign programs). LLNL develops both remote and unattended on-site sensors for early detection and assessment of proliferant activities, and we develop portable detectors for treaty inspection teams.

- *Supporting DoD's Counterproliferation Program* (because we may not be able to prevent proliferation in all cases). LLNL is pursuing technology activities to provide the DoD near-term deliverables to address chemical, biological, and nuclear weapon threats.

Reducing the Exposure of Nuclear Materials and Know-How Worldwide

Historically, the threat of the theft of nuclear weapons or materials has been contained because of satisfactory control mechanisms. As I mentioned, we are greatly concerned that the instability resulting from the dissolution of the Soviet Union could cause nuclear materials to become available for malevolent purposes. We strongly endorse DOE's efforts to ensure proper nuclear materials monitoring, material protection, control, and accounting (MPC&A) capabilities in Russia. We work closely with LANL and SNL in efforts to assist Russia in these areas.

LLNL is also engaged in many additional cooperative-threat-reduction activities in the Former Soviet Union (FSU) aimed at lessening the likelihood that nuclear materials or know-how are misused. These include: Nunn-Lugar support; efforts to foster Russian warhead dismantlement; work on surplus fissile material disposition options; lab-to-lab cooperative non-weapons projects with Russian nuclear scientists; and support of the Russian highly-enriched uranium purchase agreement.

Countering Nuclear Smuggling

LLNL is responsible for operating DOE's Communicated Threat Credibility Center, which is a unique national resource for tracking and evaluating domestic and foreign nuclear smuggling incidents in support of law enforcement, intelligence, and other agencies. Established in 1978, the Center

is linked to DOE's Nuclear Emergency Search Team (NEST). The program draws on trained assessors, laboratory nuclear weapons expertise, and a unique all-source database on illicit nuclear trafficking cases. In support of this effort, we recently initiated a research program to develop methods for forensic analysis of confiscated samples from trafficking incidents. By characterizing seized samples and packaging materials, we hope to be able to shed light on diversion points and transport routes.

Moreover, the country needs a stronger program to counter nuclear smuggling; LLNL is helping DOE develop plans for an enhanced program in this area. Elements would include: better detection equipment at border crossings, airports, and other chokepoints where smuggled material might be interdicted; improved training and equipping of customs inspectors, police, and other officials; and intensified research on how to track down the sources and routes of smuggled material.

Responding to Nuclear Incidents

The US also needs to reduce the probability that terrorist groups can use a nuclear device should they obtain one or the materials to build one. The NEST program is DOE's program to address the nuclear terrorist threat. We are continuing to develop concepts and hardware that could significantly increase our capability to both intercept and render safe smuggled nuclear material or nuclear explosives. These efforts include:

- *A concept for operational procedures and detection equipment that provide for greatly increased protection for either a military base or a city.* Such a capability would significantly complicate a smuggler's efforts to move nuclear material, even under conditions where it might be presumed that the background radiation would overwhelm the radiation of the threat nuclear material. A promising new concept, which is a spinoff of a warhead counting instrument developed for treaty verification, would provide NEST a much improved capability to use in the field to assess a nuclear threat.

- *Rendering safe nuclear devices.* LLNL has successfully designed and tested small-scale prototypes of a new disablement technique which may be capable of successfully rendering safe all types of nuclear devices. Also, we have invented a radically new device disablement concept which could safely disable explosive devices regardless of the sophistication of the threat.

Stemming Emerging International Nuclear Weapons Capabilities

To stem the efforts of a country attempting to develop nuclear weapons, we need an accurate intelligence-based assessment of its program to most effectively tailor a response. DOE national security intelligence programs executed at LLNL support long-term US government policies designed to discourage nuclear weapons proliferation and encourage the peaceful use of nuclear technology. Within the intelligence community, we provide unique insight on issues by applying our general weapons expertise and knowledge about specific nuclear weapons designs.

I mentioned earlier the leading role played by LLNL for over a decade. I should also add that although the proliferation threat has increased greatly over the last five years, DOE's intelligence budget has been nearly flat. Many countries are being covered with only part-time analysts, and the possibility of missing something important is very real. I strongly recommend increased efforts in proliferation intelligence assessment. We are able to pursue projects in this area very cost-effectively because they leverage existing capabilities of the core weapons program.

LLNL also supports US officials in international arenas such as the IAEA and UNSCOM, for example, in the post-Gulf-War inspections in Iraq; in direct negotiations with countries like India, Kazakhstan, North Korea, Russia, South Africa, and Ukraine; and in daily efforts to manage US exports in compliance with federal law and international commitments. DOE nuclear supplier assessments examine the flow of hardware and technology across international and regional boundaries. They help to assure that countries like Iraq comply with UN resolutions, meet treaty obligations, and use

nuclear technology peacefully. Supplier assessments also improve nuclear-related export compliance in Japan and other nuclear suppliers in Europe.

Developing Effective Detection Technologies

LLNL contributes directly to the assessment of foreign nuclear weapon research and production capabilities through development of detectors and remote sensors for early detection of proliferant activities and other signatures. LLNL's efforts, often pursued jointly with other laboratories, rely on our understanding of the target nuclear production processes. The research spans a wide range of sensor technologies, applying the best commercially available capabilities while developing more advanced systems that are needed to better address the problem. Programs are focused on developing the following capabilities, for use in both cooperative monitoring and intelligence collection scenarios:

1. *Intelligent, unattended, multi-sensor systems to monitor nuclear materials production, transport and storage.* Much of our sensor development is also applicable to law enforcement, counternarcotics, and environmental protection. One example is an application of our unattended ground sensors for controlling illegal immigration. We have designed a new sensor system for the Border Patrol to use over the next decade.

2. *Active and passive multi-spectral imagers and exploitation tools to remotely detect and characterize nuclear production activities.* Our activities in multi-spectral imagery leverage our success in the Clementine program. As you may recall, Clementine was a program to map the moon using very light-weight and cost-effective state of the art instrumentation. The next generation of this "light-sat" program can be used for a wide-range of civilian and military missions. The potential nonproliferation application is particularly exciting, but the details cannot be discussed in open session. I would be pleased to brief you on the details during a future closed session.

3. *Robust, reliable techniques for collection and analysis of environmental samples.* LLNL's Forensic Science Center, a new national analytical asset able to characterize ultratrace quantities of almost any organic or inorganic sample, developed and turned over to industry a suitcase-size 50-lb instrument for use by on-site inspection teams supporting the Chemical Weapons Convention (CWC). It uses a light-weight gas chromatograph-mass spectrometer (GC-MS) that can analyze samples extracted from soil, water, or any surface using appropriate chemical solvents. Its long operational lifetime and portability should make it a useful tool for many other applications, including emergency response personnel trying to identify an unknown chemical spill and firefighters identifying potentially hazardous emissions from warehouse fires. Our studies of possible follow-on instruments show that a unit of about half the size of the existing suitcase unit is possible.

Supporting DoD's Counterproliferation Program

Counterproliferation deals with technologies that aid the US military in projecting force in the face of an adversary that possesses weapons of mass destruction. The 1994 DOE/DoD Counterproliferation Memorandum of Understanding designates DoD to have the principal responsibility of addressing the biological weapon and chemical weapon (BW/CW) threat and DOE to have principal responsibility for the long-term technology base needed to address the nuclear threat. LLNL has many technology activities that can lead to near-term deliverables to the DoD to address all three types of threats. For example, LLNL is researching: laser technology to locate and identify specific BW/CW agents on the battlefield; several sensor technologies to locate and characterize hardened targets; and advanced laser and electronic technology to enable satellite sensors to rapidly and accurately locate mobile missile launchers in the battlefield.

Planning for an Expanded Effort

We are in the process of updating our strategic plan for the NAI Directorate, aiming at a more comprehensive program to combat proliferation and terrorist activities, using the full range of capabilities extant at LLNL. We are

also examining whether our core competencies in biotechnology and chemistry can constructively contribute support to programs designed to counter other weapons of mass destruction. In the very near future I would like to share our vision of a broader technology program that can leverage our current strengths, capitalize on the collaborative arrangements with our sister laboratories, and provide technology options in this very important area.

Summary Remarks

The DOE Stockpile Stewardship and Management Plan lays out a challenging program for the scientific and engineering staff at the national security laboratories. It represents a major change from the design and testing of weapons to a program in which intelligent surveillance of the stockpile, nonnuclear experiments, and computations form the basis of judgments about the safety and reliability of weapons. There are an analogous set of challenges in the areas of nonproliferation, arms control, and intelligence support. In both situations I agree with the Galvin Task Force that the attraction and retention of skilled people is a top priority.

I believe that the people who will be attracted by this vigorous post-Cold War program will provide the needed scientific and technical vitality. However, this is a demanding effort which requires a long-term commitment by outstanding scientists and engineers. That commitment, in turn, requires the very strong bipartisan support of Congress and the Administration. Accordingly, I urge your strong support of the $3.6 billion FY 1996 budget submission for Defense Programs. It constitutes a leveling-off of the budget (larger than FY 1995 but smaller than FY 1994) after having accommodated large post-Cold-War decreases. It reflects the need for new investments in capabilities and facilities for stewardship and management of the enduring stockpile. I also urge similar support of the program of the Office of Nonproliferation and National Security, with the exploration of mechanisms for broadened federal support from other agencies in this important area.

STATEMENT OF DR. SIEGFRIED S. HECKER, DIRECTOR, LOS ALAMOS NATIONAL LABORATORY

Mr. HUNTER. Dr. Hecker.

You drew the short straw; right?

Mr. HECKER. I get to bat cleanup.

I had a chance to revise my oral remarks while my colleagues were speaking here.

Mr. Dellums, thank you for coming back as well. I look forward to the Q's and A's. They were certainly stimulating this morning.

Al Narath talked about cheerleading. Quite frankly, I found this morning a significant cheerleading session for us. The interest that you displayed in our program, the concern that you displayed, is something I can take back proudly to our people back in the laboratory and say there are people in Washington who really care about the future of the nuclear weapons program. So I thank you.

I have given you a rather detailed, lengthy statement that covers all of the aspects that are important at Los Alamos. But I would just like to reinforce some points on the basis of the discussions this morning, and my colleagues' remarks here this afternoon.

We talk about confidence, the issue of confidence in the safety, security, reliability of the nuclear weapons. Clearly, that is important.

We over the years have finally tuned our nuclear weapons, essentially pushed the performance envelope in order to meet the requirements of our customer, and that is the Department of Defense. That tuning was based, as we have already heard this morning, on nuclear testing. It was based on the fact that these weapons would be replaced in the constant cycle of replacement and typically improvement and replacement.

Now that has gone away. Even in that era, these weapons have always required constant surveillance. In fact, babysitting. So, therefore, the confidence that we have in the safety, security, and reliability of nuclear weapons really rests, for the most part, in the people, rather than just in the product. That is why the people, the importance of getting smart people to continue to come into the nuclear weapons program is really crucial, and stands as one of my biggest challenges as Director at Los Alamos.

It is also why now the science-based stockpile stewardship program is so important. You see, before, I could always gauge the measure of confidence that we had with those occasional nuclear tests.

Mr. Dellums, as you pointed out, we never did test them all for 100 percent, but the occasional tests gave us some basis for judgment as to how confident I can be in my design and my engineers, so I can pass that confidence on to the customer and the President.

Now, I can't do that alone. So I have to rely on, how good are these people, how good are they at computers, how good are they at predicting at least bits and pieces of the performance and the best that we can do in above-ground experiments?

So we need to reach out, to do more of the science. That really is the essence. There isn't any single facility which makes science-based stewardship. It is an across the board, better fundamental understanding of what goes on. Facilities are an important aspect of that.

The second aspect that is very important is this issue that regardless of how confident you are, eventually you will need to remanufacture, and so you have to have the capability. And clearly, we heard this morning the old production complex that was huge will not be around.

The only way that we will be able to do that job is by closely integrating the research, the development, the surveillance, and the manufacturing, and to have the laboratories play a larger role in that process.

This is where I think we need to take a page out of the history of American industry, and what they have done with concurrent engineering and quality manufacturing, and learn from them aspects of manufacturing, so that we in the future will have the capability to replace as much of the stockpile as needs to be replaced and to do that in a very cost-effective fashion.

This is where programs that on the surface might look like they don't have much to do with the nuclear weapons program, such as the technology transfer initiative, are absolutely crucial to allowing us and giving us the impetus to work with American industry. And believe me, that technology transfer, in my opinion, goes in both directions. That is we learn from industry as well as industry benefiting from the laboratories.

Furthermore, the other aspect that is really important; Chairman Hunter, you talked about people with forensic knowledge, you know, the sort of hands-on knowledge and capabilities of nuclear weapons. This concept of having an integrated R&D and manufacturing complex, that is precisely one of the things it will allow us to do, is to keep a better forensic capability, because our people will have then the experience in trying to manufacture these, of doing more of the hands-on surveillance.

Quite frankly, much of the nuclear safety that we benefited from, the testing experience, was the fact that you have to handle these devices and then you have to make them go off in the ground. And that process exercises the whole safety envelope.

With that gone, then our greater involvement in the dismantlement and surveillance, in the manufacturing, becomes an avenue for our people to maintain their skills in that sort of hands-on forensic capability. I think that is really crucial.

One other just quick comment on the manufacturing end. You had a long discussion about the issue of tritium this morning. I would like to just use that example as one of the ways that the laboratories can come in and help in a very significant problem, and that is we will need tritium.

Los Alamos had come up with the idea some years ago that one could use accelerators to produce tritium instead of reactors. Today I think we have developed that idea sufficiently, that it provides an extremely attractive alternative for a surefire method by which we can supply the country with tritium and actually to do that in a very flexible fashion in the future, with an accelerator rather than with a reactor.

Those are two of the key aspects of what we do. We are also involved with a few other things that are crucial to this concept of reducing the nuclear danger we discussed this morning, and that is the issue of how we manage the nuclear materials, not only

those coming bank from the stockpile, but those that are in that production complex of the past, such as in places like Rocky Flats and Savannah River, and the same problems and concerns over in Russia. Then also, how do we handle the whole legacy issue of not only nuclear materials but nuclear waste and the cleanup of the production complex?

Then you combine that with the proliferation and counterproliferation issues. That all together makes up the pieces of what I like to call reducing the global nuclear danger. We view that as the core, central mission for the Los Alamos National Laboratory.

The one comment I would like to make, and my colleagues have covered much of that territory, Mr. Chairman, you asked the question this morning, and a very reasonable question, why in the world don't we just go over there, maybe buy some this stuff at K-Mart, and install it at the Russian facilities. And you worried about the speed at which progress has been made.

Quite frankly, having worried about this issue for some number of years, the progress in the past year has been made at a lightning speed, whereas this whole issue has been moving more than the geologic pace before then. The major issue is one that we have to have sufficient trust on the Russian side in order for them to allow us to come in and work with them on these facilities.

That is what we had been building up since 1992, when I went to Russia and their directors came to Los Alamos and to Livermore, and then Al Narath also followed up later to start this laboratory exchange, where we first did scientific experiments to gain the trust that allowed us to overcome the Government bureaucracy and stalemate in working in each other's facilities.

So I think we are now on the very rapid portion of the curve where we are making great progress. Let me just state, then, as I see it, the reduced nuclear danger is a compelling and very large and important mission, and the key, as has already been said several times today, is how do we continue to attract and to retain smart people in the nuclear weapons program?

I would just like to close with a few observations of the sort of things that my people think about when they think about the nuclear weapons program and what is going to be required. And there are four things I would like to point out:

The first is we must arrest, as my colleague Al Narath pointed out, the free-fall of the core nuclear weapons budgets. We also have lost half of our people over the last seven years in the core research and development effort.

Our people are smart enough to be able to extrapolate that and say, this program is going down and, in fact, it is going to go to zero before the year 2000 at the rates that we can extrapolate back. We must be able to turn that around. The 1996 budget is a very good sign, and I think we need to accomplish that, and we need to keep that up in 1997 and beyond.

Second, it has become quite clear that Los Alamos will shoulder an increasingly large burden of the overall nuclear weapons program. I think to a large extent, that is because of our historical role in the facilities that we have at Los Alamos.

Several of these are one-of-a-kind facilities. We desperately need your help in maintaining and modernizing these facilities. The cost of operations are simply taking us into the ground right now.

Third, is the issue of complementary programs. You know, whether these programs are working for the Pentagon to help with nonnuclear munitions or in the energy or environmental arenas, or working collaboratively with industry, these are crucial to maintaining the laboratory to stay sharp technically. I believe you should not just tolerate those programs, but you should actually encourage us to use our skills and help to maintain those core competencies.

The issue is really one of the enormous leverage that the U.S. Government gets by our involvement in these civilian programs.

The fourth and final point is that Mr. Galvin was right in his report where he talked about the enormous burden of the oversight, of the government oversight at the laboratories. We need your help and that of DOE to allow us to control our costs and to increase our productivity by really bringing that oversight under control, and by favoring the sort of changes that were mentioned in appendix B of the Galvin report.

On the issue of the Government—this is just a last comment—I also hope that you help us retain contractors such as the University of California. Because all of the things we were discussing this morning, science-based stockpile stewardship, the whole aspect of the capabilities of the laboratory, attractive environment, certainly for two of our laboratories, it has been important that the university has been there since the beginning. I think it should be congratulated and thanked for the job it has done over the years, whereas in the past few years it has been more chastised than thanked.

The university has brought a lot to the Nation in this whole issue of nuclear weapons, and we certainly have appreciated its role.

Those are the comments I wanted to make.

I look forward to your questions.

Thank you.

Testimony of Siegfried S. Hecker,

Director

Los Alamos National Laboratory

Hearing

of the

Subcommittee

on

Military Procurement

Committee on National Security

United States House of Representatives

March 29, 1995

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Appendix: Nuclear Weapons Stewardship at Los Alamos National Laboratory

TESTIMONY OF SIEGFRIED S. HECKER, DIRECTOR

LOS ALAMOS NATIONAL LABORATORY

MARCH 29, 1995

Mr. Chairman, thank you for the opportunity to testify before this committee. Los Alamos takes very seriously its role in both defense and in science and technology for the future of our nation, and we stand ready to work with this committee in ensuring United States leadership in both of these areas. There are four points that I would like to make today.

1. *Our nuclear weapons role has changed but not diminished—Los Alamos' focus is on helping to reduce the global nuclear danger.* Jointly with the Department of Energy we are well on our way toward planning a rational post-Cold War nuclear weapons program that will provide for a safe, secure, and reliable nuclear deterrent in the absence of nuclear testing. This will include a transition from a system based on the large capacities of the nuclear weapons production complex of the past to one that relies heavily on the capabilities resident in the Department of Energy (DOE) defense laboratories. Similarly, we are beginning to tackle the hard problems of how to contain the proliferation of nuclear weapons and how to deal with the legacy of nuclear materials, nuclear waste, and environmental cleanup.

2. *The FY 1996 budget at the laboratories is crucial to retaining the competencies and ability to accomplish this transition.* While the President's FY 1996 budget does arrest the drop in weapons program funding, we are not investing in maintaining the key facilities at Los Alamos that the nation is increasingly relying upon for a safe, secure, reliable, and affordable stockpile for the future. The escalating costs of our operations, especially our nuclear facilities, are draining our programmatic funds to the point where we will not be able to stem the loss of crucial talent.

3. *We desperately need the management and oversight changes called for in Appendix B of the Galvin report.* These changes would restore the intent of the government-owned, contractor-operated system that has been eroded by incremental increases in oversight. The changes will be instrumental in allowing us to control the skyrocketing costs of our facilities and operations. We are encouraged by the steps the Department has taken to date to initiate the changes called for in Appendix B of the report.

4. *Today, nonnuclear defense research and civilian basic research and technology done in partnership with universities and industry are crucial to our nuclear defense mission.* Selected programs allow us to use our core technical competencies in the broader national interest to leverage nuclear weapons funding and help to provide a stimulating research environment that allows us to attract and retain world-class research talent to serve the nation.

I. A COMPELLING MISSION

Our central mission evolved from developing the first atomic bomb during the Manhattan Project to developing nuclear weapons for deterrence during the Cold War. We accomplished both successfully. Today, the Cold War cycle of nuclear weapons development and deployment has ended, and so our central mission must reflect the incredible global events of the past five years. In conjunction with the Department of Energy we define our primary mission as providing the technical foundation to *reduce the global nuclear danger* to ensure a more secure future for our nation.

Stockpile Stewardship and Management

A central and vital component of *reducing the global nuclear danger* is nuclear weapons *stockpile stewardship*—keeping those weapons that the nation needs safe, secure, and reliable. Stockpile stewardship also requires that the nation retains the capability to respond to a variety of uncertain futures. *Reducing the nuclear danger* will also require *stockpile management*—providing the capabilities ranging from dismantlement to reconstituting manufacturing if some weapons need to be remanufactured in the future. Much of the stockpile surveillance, dismantlement, and manufacturing technological expertise will eventually reside only at the laboratories. An overview of our vision of nuclear weapons stewardship is attached to this testimony as an appendix.

Los Alamos has historically been a major contributor to national security through its role in developing and assuring the United States nuclear deterrent. The stockpile is now being drawn down, but the recently completed Nuclear Posture Review concluded that nuclear deterrence remains central to the security of the United States and that we must hedge by maintaining capability. With the many changes of the last several years, the weapons laboratories' role has evolved to a new and in many ways more technically demanding challenge. They must provide for stewardship of the stockpile without nuclear testing as weapons age beyond their design lifetime, and they must provide a smaller, more economical, and environmentally responsible capability for fabrication and replacement of weapon components. We have been pleased to work jointly with the Department and Dr. Reis in developing a vision of how such an enterprise could look in the year 2010, and in beginning to turn it into a rational plan for the evolution of the nation's nuclear complex. This vision joins a capability-based deterrence with a right-sized capacity for weapon component manufacture and replacement, at an ultimate real saving to the taxpayer compared to continued reliance on remnants of the Cold War infrastructure.

This enterprise centers on the stockpile stewardship and stockpile management programs. We must have the intellectual capital and technical tools that we will rely on to accurately evaluate and revalidate the performance, safety, and reliability of stockpile weapons, and when necessary judge that an aging weapon or weapon component needs to be repaired or replaced. This same set of expertise and tools must be able

to certify that such a repaired or replacement weapon will itself be safe and provide the expected performance. This is the challenge facing the science-based stockpile stewardship program, which provides the science and technology for evaluation and judgments on the efficacy of the enduring stockpile. Under a comprehensive test ban and stringent international nonproliferation regime, these judgments and evaluations must in the future be based on science-based understanding rather than the dramatic and clear validation obtained from a nuclear test. We have, of course, always relied on science and excellence in our scientific expertise as the foundation of our nuclear weapons activities. To answer the challenge now posed to us, however, we must improve our understanding and modeling, and this requires improvements in both our computational and experimental science capabilities. This in turn requires the funding and institutional vitality necessary to keep excellent, experienced people.

The stockpile management component of the enterprise is the fabrication, maintenance, and materials management counterpart of the Stockpile Stewardship Program. This program has responsibility for the many limited-life components that must be periodically replaced, for the management and production of tritium, and for fabrication of the components, as necessary, of nuclear weapons. A key part of these responsibilities is the technology for processing and fabrication of plutonium parts for weapon primaries, which historically had been manufactured at Rocky Flats.

Together, science-based stockpile stewardship and stockpile management will link science, materials, and manufacturing, and the surveillance of stockpile weapons to provide for assurance in the safety and capability of our deterrent. Science-based stewardship will develop the capability for confidence in the stockpile in the absence of a nuclear testing program. Stockpile management will assure the physical capability to maintain and replenish weapon components and systems. The Department has undertaken to prepare a programmatic environmental impact statement on stockpile stewardship and management.

The United States' nuclear stockpile is presently judged to be safe and reliable. However, problems with safety, performance, or reliability have historically been observed and will continue to occur. Weapons change due to material degradation, corrosion, and other factors. Cracks and voids can develop in components. Helium impurities from radioactive decay will build up in plutonium. To illustrate why proper stockpile stewardship and stockpile management are such an important issue for national security, we can look to some of our historical experience. Of the weapon types introduced since 1970, nearly one-half used post-development nuclear testing to verify, resolve, or fix problems. Also since 1970, several thousand stockpile weapons underwent major modifications or were hastened toward retirement because of safety or performance concerns. These kinds of problems have been observed in weapons designed by both design laboratories. A particularly clear example, because it involved an unexpected aging phenomenon, was the now-retired warhead for the Poseidon SLBM. The high-explosive in this warhead was discovered to be decomposing prematurely and had to be replaced lest the weapon become inoperable.

Because certain materials had become commercially unavailable since the original development program, other modifications were required in addition to changing the high-explosive formulation. Nuclear tests helped ensure that these modifications did not compromise the weapon's performance. This experience also illustrates the concern that identical remanufacturing cannot necessarily be assured and that expert evaluation is needed. In the absence of nuclear testing, the certification of such changes will indeed be a technical challenge requiring a strong base of scientific expertise.

Tritium Supply

Tritium supply is a critical issue for the nuclear weapons stockpile since tritium decays at 5.5% per year. The tritium production reactors at Savannah River have been shut down since 1988, and the DOE has been in the process of developing a replacement capability. To support the projected stockpile level called for in the Nuclear Posture Review, the DOE must have a new operational tritium supply by the year 2011. Although new production reactors have been considered, another option, accelerator production of tritium (APT) is under study. The APT option proposed by Los Alamos has become very attractive because of the reduced amounts of tritium required in the new stockpile projections.

The APT project is a national effort begun in FY 1992 with Los Alamos, Brookhaven, and Sandia. Industrial participation during the period from FY 1992-1995 was obtained by competitive bid selection of Bechtel, Grumman, General Atomic, Westinghouse, Maxwell-Balboa, and Merrick. The advantages of using an accelerator for producing tritium include high flexibility to meet demand, low environmental, safety, and health impact because there is no fissile material in the system, and greater public acceptance compared to a reactor.

The current DOE plan is to release a draft Programmatic Environmental Impact Statement very soon, with a Record of Decision on the technology of choice by November, 1995. There are five proposed sites for tritium production: Savannah River, Oak Ridge, Pantex, Idaho National Engineering Lab and the Nevada Test Site. Site selection will be made later and in the context of the DOE plan for the entire weapons complex.

Los Alamos' Role

Los Alamos is ready to serve the nation as a key part of the Department of Energy's vision of capability-based deterrence. *Of the seven systems that will remain in the U.S. nuclear arsenal after the turn of the century, Los Alamos designed and engineered five.* Continuing responsibility for these nuclear weapon systems is a core responsibility of the Laboratory. In addition, many of the key capabilities required for both stockpile stewardship and stockpile management are either principally or uniquely located at Los Alamos.

The absence of the large, capacity-based enterprise in the future places challenging new requirements on the Laboratories, especially Los Alamos, to assure the availability of components needed to maintain that stockpile. One of the responsibilities related to this goal is to demonstrate the ability to produce small quantities of war-reserve components for the existing stockpile. Los Alamos will apply the strengths of its research and development to many of the requirements for the manufacture of materials and components for the enduring stockpile. Manufacturing and certification of components at Los Alamos will be done differently than previously in the complex, but will maintain the same exacting quality standards found in components produced earlier. The difference in Los Alamos' approach to manufacturing lies primarily in three areas: First, manufacturing and research and development activities will be integrated in a seamless fashion that will promote the manufacturing of high-quality, certified components in a cost-effective manner. Second, this integration will provide the means to maintain critical Laboratory skills and expertise while conserving existing resources. Third, manufacturing activities will build on our experiences and partnerships with industry.

These differences are illustrated by a recent manufacturing activity in Los Alamos' Detonation Systems Group. This group received the mission of detonator manufacturing in the DOE's Non-Nuclear Reconfiguration initiative and is tasked with demonstrating manufacturing capability in January 1996. Recently, though, this group was assigned responsibility for producing actuator simulants, not detonators, but related electrical devices used to verify aspects of weapon reliability. The simulants were required and produced on an accelerated schedule with only four weeks for fabrication, and with limited funds, yet they were manufactured with the formality and demonstrable quality of a level appropriate for a DOE "diamond-stamped" product. This success confirms the key elements mentioned above—seamless integration of research and development and manufacturing using crucial skills available in the Laboratory.

This integration of research and development and manufacturing capability at Los Alamos is a tribute to effective partnerships formed within the Laboratory and with the DOE's Albuquerque Field Office. This partnership enabled Los Alamos to use quality methods and techniques learned from private-sector companies, Motorola and Milliken, to produce these components with controls appropriate to stockpile items, but at a dramatically reduced cost. It is precisely this type of effort that will allow Los Alamos to help maintain the stockpile and retain critical expertise, all at reduced cost to the taxpayer.

The extensive plutonium research and fabrication capabilities of Los Alamos are essentially unique in the United States. In recent years, Los Alamos has taken on the critical responsibility of surveillance of the plutonium "pits" from stockpiled weapons primaries. Recently we have begun to recognize that stockpile-focused, science-based stewardship calls for a new and more integrated relationship between fundamental science, computational simulation, and surveillance. In this new relationship, the science and simulation will teach us to be more insightful and clever in our surveillance measurements to detect and

anticipate problems, as well as being used to interpret surveillance results to evaluate the current and future status of a weapon system. This is a lot like the close relationship between clinical medicine and biomedical research. The combination of Los Alamos' research capabilities with its many specialized facilities for plutonium, uranium, high-explosives, and other weapons materials provides an excellent opportunity to grow this kind of synergistic relationship.

One of the most exciting challenges in science-based stockpile stewardship is that of developing the computational methods and tools that we will need to accurately evaluate whether the aging stockpile needs repair and to certify any remanufactured or replacement weapons. Los Alamos has been a leader in the development of high-performance computing and in exploiting massively-parallel computer technology for three-dimensional weapons safety analysis and other complex applications. In addition to the core computational activities supporting our stewardship responsibilities, our participation in the Accelerated Strategic Computing Initiative (ASCI) will ensure that the needs of these crucial applications are met by enabling a significant enhancement of the physical and numerical models and by accelerating the development of the relevant technologies to be delivered by the vendor community.

Computational simulations are only as good as the science and physical models that they apply. Validation of modern computer codes against the underground test data archive is essential but far from sufficient. The understanding that we will need for accurate evaluation in the absence of nuclear testing will also require data from a suite of experimental facilities such as the Dual Axis Radiographic Hydrotest Facility (DARHT), the Los Alamos Manuel Lujan Jr. Neutron Scattering Center (LANSCE), and the Atlas pulsed-power facility, each of which addresses important issues in stockpile performance and reliability.

Hydrodynamic tests—high-explosive-driven experiments for studying primary implosions—constitute the most important aboveground, nonnuclear testing capability for nuclear weapons. They allow an integral test of our prediction of these implosions and address the most important issues for the stockpile, the functionality and safety of the primary. The current X-ray radiographic facilities in the United States are insufficient for the kinds of evaluation we will have to make in the absence of nuclear testing. DARHT was initiated to provide the necessary capability in radiographic quality together with a second, simultaneous view from another direction, which will enable three-dimensional imaging so necessary to predictions of nuclear safety and reliability. The construction of DARHT has been halted by court action pending completion by the DOE of an Environmental Impact Statement (EIS) including consideration of alternatives, and the issuance of a Record of Decision. We believe that the capabilities DARHT is designed to provide remain a vital component of the suite of tools necessary to maintain confidence in the nuclear stockpile.

LANSCE, for its part, will provide an opportunity to employ the unique penetrating capability of neutrons to study various materials science issues, including many related to aging. Materials issues can be exceedingly important for predicting compression in supercritical weapon assemblies and for inferring nuclear reactivity in the absence of direct nuclear testing. Neutron resonance radiography will also shed light on high-explosive behavior. Neutron radiography of weapon components, including primaries and secondaries, is an important emerging capability in our long-term plans to assess the effects of aging in the enduring stockpile.

LANSCE will also provide critical data in the area of applied nuclear physics. Recertifications of designs will depend on careful analysis of past data in order to properly attribute performance effects to constituent physical processes. Finally, LANSCE will offer the opportunity to refine our detailed models of the fission process itself. These effects may prove significant in explaining performance-related phenomenology, details that are required in building truly predictive simulation tools.

Much of weapon science depends on detailed study of hydrodynamic or radiation physics, often at higher energy densities than can be readily obtained in macroscopic experiments. Atlas is a pulsed-power facility that will enable us to study phenomena associated with both weapon primaries and secondaries with centimeter-scale experimental configurations, at temperatures and pressures high enough to partially ionize the materials. Atlas, DARHT, and LANSCE were endorsed by the recent JASON report on science-based stockpile stewardship, and the Department has proposed Atlas for a FY 1996 start. DARHT, LANSCE, and continued experimentation were also explicitly recognized by the Galvin Task Force as needed for stockpile stewardship.

These three critical facilities represent the capital improvements needed for science-based stockpile stewardship. Costs for these facilities and projects, as proposed to the Department, are as follows:

Facility	Total (Project) Cost	Comments
DARHT	$124 million (includes first axis, initiated in 1988, $85.6 M, and projected second axis, $38.2 M).	Partially completed. Pending outcome of EIS, earliest completion of first axis in CY 1998. Record of Decision may affect costs.
LANSCE	$35 million upgrade to existing facility has been appropriated and is under way.	Annual operating funds of $25M from Defense Programs will be leveraged by funds from the Office of Energy Research. Additional operating funds will be required.
Atlas	$48 million	FY 1996 start with completion in FY 1999.

The upgrade to LANSCE, now under way, will also benefit the weapons program directly through its contribution to APT. Los Alamos was chosen by DOE to be the lead laboratory for APT development,

and LANSCE will play an important role in demonstrating concepts for APT. If APT is selected as the technology of choice, an industrial partner will be chosen by competitive bid as early as possible in FY 1996 to serve as the integrating contractor throughout the life of the project.

Los Alamos is ideally positioned to lead the national APT effort, having high-power accelerator design and operating experience, high-power beam target design expertise, and a strong nuclear physics and engineering base. Although the APT design is based on existing technology and well established principles, there are several areas that require additional technology development in order to determine the most cost-effective, reliable system. Work to be conducted at Los Alamos over the next four years includes three main areas: 1) construction and demonstration of the performance of the first few sections of the accelerator, 2) demonstration of the tritium production efficiency using present accelerator facilities, and 3) further study of the properties of APT materials under irradiation at equivalent beam power flux using the 800-kilowatt beam from LANSCE. I urge the Committee's support for this important research and development effort.

Nuclear Materials Management and Disposition

Reducing the nuclear danger will require *nuclear materials management*—assuring the availability or safe disposition of plutonium, highly-enriched uranium and tritium. It is currently projected that a new supply of tritium will be needed by the year 2011. This issue was discussed above under stockpile management. No need for new plutonium or uranium is anticipated in the foreseeable future. The principal concern is one of safe disposition. Currently, many hundreds of tons of these materials exist not only in returned warheads, but also as production scrap, residues, or nuclear waste. We are particularly concerned about the disposition of these materials in the former Soviet Union where these weapons-grade materials represent a significant proliferation danger.

A major challenge lies with the responsible management of nuclear materials, especially plutonium. Reduction of the nuclear weapon stockpile, together with the subsequent dismantlement of weapons and the facilities that formerly produced them, has left the nation with growing and degrading inventories and decreasing capability to address the problem. At Los Alamos, we have the expertise, facilities, and most importantly, the broad global perspective needed to effectively address this issue.

The driver for nuclear materials management in the United States comes primarily from concern for public and worker health and safety and risk to the environment. The Department of Energy has recently completed a study of the vulnerabilities associated with the deteriorating conditions of plutonium storage across its facilities and has undertaken a program to address shortcomings and assure safe and secure storage pending decisions on ultimate disposition. This important vulnerability study was initiated in part as a result of early efforts by Los Alamos to identify and analyze problems involving plutonium storage

containers. Los Alamos researchers were then called upon to train the vulnerability assessment team in relevant material properties and hazards related to plutonium processing and storage. Los Alamos has also taken the lead in stabilizing its own inventories as well as in developing and demonstrating technologies that can be applied to remediate nuclear material vulnerabilities across the complex.

At the Rocky Flats Plant that formerly produced all of the plutonium pits for the nuclear arsenal but is now destined for closure and restoration, 12.9 metric tons of plutonium inventories exist in a spectrum of undesirable material forms that have been largely untouched since production operations were suspended at the site in June 1989. Because of its weapons stewardship role, Los Alamos has the personnel and facilities to help stabilize and secure the plutonium residues at Rocky Flats. The capabilities that we maintain for our weapons stewardship role are also available to DOE to characterize and stabilize plutonium-containing materials at other sites. We consider this effort to be one of the most urgent in the entire DOE complex. In fact, our people have advised and aided Rocky Flats management for a number of years. In the past couple of years, the direct involvement of Laboratory personnel has greatly enhanced assay, examination, and stabilization capabilities that will allow for rapid analysis and reduction of potential hazards at the site.

For example, portable radiography equipment from Los Alamos was used to interrogate a drum of high-plutonium-assay residues that had been mislabeled at the time it was placed in storage. This drum could not be moved because of a suspicion that the material in the drum was so highly pyrophoric that it could ignite and burn spontaneously. The radiography equipment demonstrated that this was not the case and the drum could be moved. Los Alamos employees are currently working with the site contractor personnel to design and assemble real-time radiography equipment of their own.

Some of these materials are in solutions that are starting to leak out of their containment and present a significant risk that needs to be addressed at Rocky Flats. In recent experiments, Los Alamos has used its expertise and facilities to demonstrate that the liquid stabilization approach first proposed would not meet the established criteria and has developed and experimentally demonstrated an alternate approach that meets all the criteria and has been embraced by Rocky Flats. The procedures are being developed and the personnel are being trained at Los Alamos to expedite implementation of this liquid stabilization process at Rocky Flats.

The nation can further leverage its investment in Los Alamos plutonium processing capabilities for the solution of DOE's pressing plutonium problems, including stabilization and storage of plutonium-bearing materials. Los Alamos has recently demonstrated several technologies that purify and efficiently partition nuclear materials from other waste thereby reducing radioactive waste generation, cost, and risk. For example, we have demonstrated technologies for separating plutonium-containing salts, a big concern at

Rocky Flats, from bulk waste. This technology can save hundreds of millions of dollars compared to planned direct disposal in repositories and can have wide applicability across the complex.

In another example, we are examining the possibility of fabricating processing lines in mobile or transportable assemblies. If successful, this approach could minimize transportation risk by moving laboratories for stabilizing residues to sites within the weapons complex, eliminating the need for expensive construction of processing facilities and personnel training at other sites. This approach would provide an optimum method for exporting stabilization technologies to Russia.

Los Alamos is enthusiastic about applying its extensive expertise and special facilities to other key tasks at Rocky Flats and around the DOE complex. At Rocky Flats we are also working on nuclear criticality safety, safe storage standards for metals and oxides, stabilization of other residues, and in support of the environmental restoration program at the site.

The types of plutonium problems we face in the United States at Rocky Flats, Hanford, and Savannah River sites are compounded in Russia by additional concern for the security of the nuclear materials. I will discuss below what Los Alamos is doing to help combat the proliferation concerns in the states of the former Soviet Union by introducing western nuclear materials protection, control, and accountability standards and practices.

In addition to concerns over military plutonium, the amount of civilian plutonium from nuclear reactors around the world is already several times greater than the military stockpiles of the United States and Russia—and it continues to grow. Most nations view this plutonium as an energy source for their future generations, and they are not about to dispose of it without extracting useful energy. This places an additional burden on the United States to work with the international community to find a long-term solution to the plutonium problem. First, we must stabilize materials such as those at Rocky Flats and similar materials in Russia. Then, we must secure these materials, store them under an international safeguard regime, and develop suitable techniques for disposing of the materials and their waste.

Los Alamos is also investigating new technologies for ultimate disposition of plutonium, such as the development of mixed oxide fuels for partial burning in reactors, and accelerator based transmutation technologies for complete destruction of plutonium. Several of these technologies may also address the larger problem of plutonium in commercial power reactor spent fuel. This is the kind of challenge that laboratories like Los Alamos can help to tackle.

PROLIFERATION CHALLENGES

Reducing the nuclear danger will require *the development of effective nonproliferation and counter-proliferation technologies.* We must keep nuclear weapons, nuclear materials and nuclear weapons knowledge out of the wrong hands. The threat of proliferation of weapons of mass destruction poses the most significant risk to our national security today. The defense laboratories are applying their skills to develop technologies for nonproliferation (keeping the materials out of the wrong hands) and counterproliferation (responding to the proliferation threat), and we are working with our former adversaries in Russia to prevent diffusion of nuclear materials and expertise.

Russian Nuclear Weapons

One of the principal proliferation challenges is that related to the nuclear weapons and weapons expertise of the former Soviet Union. The national laboratories are actively engaged with our counterparts in Russia to prevent the diffusion of weapons, materials, and scientists to countries that would represent a proliferation risk. Our interactions with the Russian institutes have two objectives:

- Stabilization of weapons expertise. Russian weapons scientists are an extremely valuable asset to a potential proliferator. By working with these scientists and directing their attention to peaceful, yet scientifically challenging problems, we reduce the likelihood of their emigration or their working for a rogue nation.
- Stabilization of weapons and weapons-capable materials. The shortest routes to proliferation are to obtain a complete weapon, critical weapon components, or materials. We are assisting the Russians to develop and apply technologies and systems to help prevent such a diversion.

Los Alamos is engaged in what are called laboratory-to-laboratory collaborations with Russian nuclear weapons and nuclear energy institutes. These collaborations are aimed at jump-starting work on the two above-mentioned objectives. These collaborations are able to advance productively while more formal government-to-government deliberations are proceeding.

We see these laboratory-to-laboratory efforts complementing those of our governments. The scientific relationships that have been developed with our Russian counterparts have allowed us to make significant and rapid progress. Let me highlight just two examples.

Scientific Exchanges: The first joint scientific experiment involving the nuclear weapons laboratories of the United States and Russia (Los Alamos and Arzamas-16) was performed in September, 1993. This has been followed by five others in several areas of basic science. Many publications have resulted, and the interaction receives broad and frequent coverage in the Russian press, helping to blunt concerns over U.S. motives for working in Russia. A number of Russia's core weapons people are now working

almost full time on these projects, with the expectation that they will soon be supported to do scientific work, rather than weapons design, by the Russian government.

Materials Protection, Control, and Accountability: Trust developed during the scientific exchanges enabled Los Alamos to put into place and lead a program in nuclear materials control that now involves five other U.S. laboratories and ten key Russian nuclear institutes. Contracts were signed within four weeks of funding, and the first major demonstrations occurred within six months. The Russians now want to move faster and further than our funding will allow, a contrast to other programs in this area.

Recently, at Arzamas-16, a demonstration of equipment and methods for safeguarding nuclear materials was completed. The demonstration was designed for Russian facilities such as those for nuclear weapons disassembly and storage of highly enriched uranium and plutonium. The best of United States and Russian equipment, methods, and concepts were employed in this work. The demonstration was also designed to give the operators and managers of Russian facilities hands-on experience and familiarity with improved materials protection, control, and accountability methods, which would then be introduced into their operating facilities. These methods are now to be deployed throughout the Russian nuclear weapons complex.

The DOE nonproliferation and arms control program is funded at $76.8M in FY 1995. In FY 1996 the DOE request of $162M represents an $85M increase to capitalize on major opportunities created by the lab-to-lab programs for control of Russian nuclear materials and scientific exchanges. Based on the success of the laboratory-to-laboratory program in the last two years, we are now poised to make a major contribution to the safety and stability of Russian weapons, materials, and expertise. This is exciting and important work that I hope will receive the support of this Committee.

Verification and Control Technology

Technology: With negotiations underway on a comprehensive nuclear test ban treaty, we face new challenges in verification technology. Our concerns with nuclear testing are no longer focused solely toward the former Soviet Union, but toward the much more complex threat of nuclear tests that could occur in any medium and in any part of the world. The challenge of discriminating among signals that could arise from natural phenomena as well as from nuclear tests of unidentified origin is an extremely difficult one. We are responding to it by studying a suite of monitoring technologies—seismic, acoustic, radiochemical, and electromagnetic as well as satellite-based observation. Meanwhile, to deter proliferation at an even earlier stage, Los Alamos and other laboratories cooperate in the DOE's proliferation detection technology program. This program supports advanced technologies such as laser monitoring of atmospheric emissions, multispectral thermal imaging of suspect areas, and effluent monitoring (soil, water, and air) to detect the presence of potential proliferation activity. Still other

contributions to nonproliferation and anti-terrorist efforts come from programs in emergency response, export control, and intelligence analysis. With increasingly huge amounts of proliferation-related data, the unparalleled Los Alamos computing capability will be increasingly important for information integration and management.

Analysis: The intelligence program element provides a mechanism to engage the DOE laboratories in the analysis of foreign nuclear weapon capabilities and trends. For example, estimates of the Chinese nuclear program have been most helpful to national-level decision makers. An evolving activity that has received recent notoriety is the illicit transfers of special nuclear materials. The DOE intelligence unit is engaging the national laboratories in helping to assess potential sources, suppliers, recipients and networks. In this era of widespread information regarding nuclear technologies, including weapons, the laboratories also help in assessing potential proliferation pathways and interdiction options.

For over thirty years the DOE national laboratory and United States Air Force joint effort has produced a highly successful and cost-effective, satellite-based verification program. Another example is technical support to the International Atomic Energy Agency (IAEA); Los Alamos has been the most consistent and productive supplier of new safeguards technology to IAEA safeguards inspectors monitoring nuclear power facilities for the past twenty-five years. The weapons laboratories provided experts and technology during the Iraq and North Korea crises—to the UN Special Commission in the case of Iraq and to the State Department during the confrontation with North Korea over its nuclear weapon program. Because they draw on the same suite of technical skills, the strong synergism between stewardship and nonproliferation activities must be continued at Los Alamos.

Satellites: Our small satellite program has been very successful in demonstrating the viability of a new approach that allows the design, construction, and launch of satellites using advanced technologies for arms control and verification activities on very short time schedules compared to conventional satellite launch schedules. This program is another good example of how we approach our work. The design and purpose of the program is verification, but the satellites produce information of interest to the astrophysics research community as well.

Counterproliferation

Counterproliferation efforts in the 1990s must focus on threats posed by chemical and biological weapons as well as nuclear weapons. Counterproliferation activities include detecting the spread of such weapons; deterring it through incentives and force; responding with appropriate military and diplomatic tools; and protecting U.S. citizens, property, and interests worldwide. The Department of Defense is defining the scope of counterproliferation efforts and is integrating its efforts with those of other agencies. Los Alamos has responded to the new counterproliferation initiative by establishing a dedicated

counterproliferation office and by expanding its participation in a number of emergency response programs. The new effort at Los Alamos is built around the Nuclear Emergency Search Team (NEST) and Accident Response Group (ARG) programs, both of which are funded by DOE. These teams address the potential need to find and secure nuclear weapons and nuclear materials in unusual circumstances. NEST/ARG-related skills will be expanded to address chemical and biological threats. Thus, the expanded counterproliferation program at Los Alamos will be closely coupled to the existing nonproliferation program.

In support of counterforce options in counterproliferation, we are applying modeling capabilities and techniques developed in our conventional munitions programs to analyze the lethality of fragmentation and hit-to-kill warheads against various threats, including canister munitions that may contain chemical or biological agents. The demonstration of multimode warhead munitions to drastically reduce logistics and strike-planning burdens is also being pursued. These lethal mechanisms are optimized for a wide spectrum of targets from a single warhead package.

THE ENVIRONMENTAL LEGACY

Reducing the nuclear danger also will require that we *clean up the legacy of 50 years of weapons production.* As the global military threat recedes, it is imperative that we turn our attention and technical talents to remediating the environmental problems in the defense complexes of the United States and the former Soviet Union.

Los Alamos is applying its multidisciplinary staff and dedicated resources to areas of concern including waste minimization, characterization and remediation (including treatment, disposal, and storage), environmental restoration, waste management, and pollution prevention. DOE possesses a number of legacy wastes (hazardous, high- and low-level radioactive, transuranic, and mixed) that are complicated and often heterogeneous in nature. These waste types pose a significant treatment and management challenge. Industry faces similar problems. For example, waste from nuclear medical procedures shares many of the characteristics of mixed waste.

The Galvin Task Force pointed out the opportunity to apply new science and technology to applications in environmental remediation. A larger fraction of the environmental restoration program budget should be allocated to research and development activities. There are many new areas of technology which, if developed further, could yield benefits both in cost and in reduced hazards to the public and the environment compared to current technologies.

Waste management science must evolve to bring under control the large volume of waste and contaminated material that come from restoration and decontamination and decommissioning activities.

The following table shows just three areas in which Los Alamos is developing technologies that have application to a number of sites in the DOE complex.

DOE Needs	Los Alamos Technology Areas	Applicable Sites	Industry Partners
Low-level radioactive contamination from soils	Magnetic separation	Savannah River, Nevada Test Site, Rocky Flats Plant, Hanford, Idaho National Engineering Laboratory, and military armor penetrator firing ranges.	AWC Lockheed CRADA established with Los Alamos
Effluent wastes, volatile organic compounds (VOCs), nonarid site VOCs, hazardous-solvent-contaminated machining oils, incinerator/thermal unit off-gas, arid site VOCs, vapor-plume VOCs, solvents, explosives/munitions secondary treatment	Silent discharge plasmas	Savannah River, Rocky Flats Plant, Hanford, Los Alamos National Laboratory, Department of Defense, Electric Power Research Institute (EPRI)	EG&G, General Electric, and Westinghouse
Separation of radioactive constituents and organics from high-level defense waste	Chemical separations	Savannah River, Hanford, Rocky Flats Plant, and Los Alamos National Laboratory	Grumman, General Electric, TRW, IBM, General Atomics, McDonnell Douglas, and Westinghouse

People and Facilities

To accomplish the mission outlined above, we need outstanding people and the right facilities. Being embedded in a major research university, the University of California, has helped us attract the best talent available. However, the steady decline in nuclear weapons funding since 1987 has jeopardized our ability to keep the best people in the nuclear weapons program and has severely hampered our ability to attract bright young people to work in the program. The precipitous drop in full time equivalent employees in the core nuclear weapons research, development, and test program by a factor of two over that time span has sent a strong and negative message to our staff.

Ensuring that the enduring stockpile will remain safe, secure, and reliable depends on our ability to turn around the grim picture of the past few years. After all, our confidence in nuclear weapons rests not so much on the final product, but in the people. I view it as imperative that the turnaround in the President's FY 1996 budget is preserved and that within this budget we can spend more of it supporting people doing real technical work and in investing in the upkeep of key facilities. We must turn around the inordinate burden of government oversight that has sapped our strength and morale. The DOE has started some initiatives to make the oversight process more efficient, but we still have a very long way to go.

In addition, we must leverage the nuclear weapons work with other programs to which we can make significant contributions that will simultaneously reinforce the core competencies required for the nuclear weapons program.

People

Of three negative trends in our workforce discussed in testimony to the House Armed Services Committee last year—the aging of the workforce, a high level of unanticipated early retirements, and the resultant downsizing of the workforce driven by the inability to hire replacements due to shrinking budgets, only the second has stabilized. The Galvin Task Force rightly identified the need to attract and keep skilled people in the program as the most important priority for the management of science-based stewardship of the stockpile.

However, in spite of the continued decline in the workforce due to retirements and budget shortfalls, a recently completed assessment of the skill capabilities at the Laboratory pertinent to supporting science-based stockpile stewardship does hold some good news. Because of the multiprogram nature of the Laboratory, we have been able to retain weapons-skilled people in our workforce by employing them outside the core weapons program in activities that we see as having dual benefit. These activities, related to the civilian science and technology projects, including partnerships with industry, that I will discuss below, have become essential to the support of the core weapons program.

Because of these activities at the Laboratory, we would in a national emergency be able to reconstitute a skilled weapons workforce somewhat larger than that supported by current funding levels. However, this capability will clearly erode over time and as noted last year would be insufficient to fully reconstitute capability in all critical skill areas. Of immediate concern, current and planned funding levels are insufficient to support some of the program activities required for enhanced surveillance of the existing stockpile as well as to complete the transition to a stockpile stewardship program without nuclear testing.

Capabilities

Historically, defense activities have formed the foundation of research and development at the laboratories and have allowed us to make contributions in many other areas of national importance. Shrinking budgets for weapons research and development have now reversed that situation to the point that we now use these other programs to help shore up the technology base needed for the weapons activities. Even with this strategy, however, we are beginning to lose some of the diverse capabilities that would enable Los Alamos to respond to future national contingencies. Some examples: Los Alamos has lost the capability to do high-explosive synthesis and has closed some of its laboratories that perform characterization experiments on explosives. This reduces our capability to address fundamental safety issues and respond to potential future requirements. We have had to close two laser facilities that were intended to perform laboratory experiments relevant to thermonuclear weapons physics. We terminated several advanced development programs that would have improved our experimental capability to offset the loss of testing. All of this was done in order to support urgent near-term requirements. Indeed, rather than expanding our capabilities to maintain nuclear weapons competence in the absence of underground testing—as directed by both the Congress and the President—we have been forced to reduce activity. In many areas we are currently only one or two people deep. Another round of budget cuts will clearly result in additional lost capabilities.

Facilities

In testimony to the House Armed Services Committee last year, my deputy described a "crisis in facilities" that was putting our ability to ensure the safety and reliability of the nation's nuclear stockpile at risk. Los Alamos is committed to responsible and flexible stockpile stewardship and support. This requires that the facilities essential for the DOE weapons mission can operate in compliance with all applicable safety, security, waste management, and environmental protection regulations and standards. These facilities house activities and materials that demand increasingly focused attention, with increased operating and capital funding, to ensure that safety and environmental concerns, as well as programmatic goals, can be met simultaneously. Operating these facilities has become very expensive. The current fixed cost for the Laboratory's operating nuclear facilities is in the range of 50% to 75% of total cost, and rising.

Thus the fraction of operations funding available for both programmatic work *and* necessary improvements in safety systems and procedures, process waste minimization, environmental protection, etc., is decreasing.

With the closure of many elements of the production complex, our facilities will be critical to maintaining the stockpile, supporting dismantlement, and providing the research and development expertise for remanufacturing, should this be required by the DoD and authorized by the President. They will be the only facilities of their kind in the consolidated national complex. For example, Los Alamos currently has the only capability to fabricate plutonium pits—the heart of a nuclear weapon—in the country.

The total cost of maintaining and operating a nuclear facility is being driven by more stringent requirements for demonstrating safety, security, and environmental compliance. For example, at the Laboratory's plutonium facility, the cost of operating the facility, was about 35% of that program's budget in 1987. In 1995, these costs, including lost work time by our technical staff, are estimated to exceed 75% of the total. The increased costs are being driven by

- Replacement costs for aging equipment and facilities,
- Increased requirements for formality of operations demonstrating compliance,
- Environmental compliance initiatives required by EPA, State of New Mexico, and DOE,
- Rigorous training required by new standards for personnel qualification,
- Ever-increasing concerns for safeguarding nuclear materials, and
- Increasingly burdensome government oversight in all operational and administrative functions.

A healthy infrastructure is also a requirement for efficient operation of a complex institution such as Los Alamos. That infrastructure is at risk in times of prolonged budgetary pressure because infrastructure investments are not uniquely associated with a specific product. In times of transition, and without sufficient designated investment capital, the infrastructure burden on programs has become heavy and overwhelming. It is time to recognize that these critical government-owned facilities must be upgraded and maintained consistent with current regulatory standards and good business practice. The Galvin task force report pointed out that "If we do not correct this facility situation, the cost of managing and maintaining facilities "today's way" will soon be so costly that it may substantially consume the laboratories' budget." The task force report goes on to say that management improvements could then significantly reduce the costs of maintenance of renewed and modernized facilities.

While we believe that our facilities are operating safely and present no threat to our employees, the public, or the environment, proper investment is needed now to ensure that they will remain operational and will continue to serve the nation's defense needs. We are working with the DOE to better estimate

what will be required over the next several years at Los Alamos However, we expect that an investment of the order of $100 M per year in capital, construction, and operating funds will be required.

CONVENTIONAL DEFENSE

In 1985, the President's Blue Ribbon Task Group on Nuclear Weapons Program Management headed by Judge William Clark concluded that the DOE defense laboratories (Los Alamos, Sandia, and Livermore) should be tasked to serve some of the research and development needs of the Department of Defense in nonnuclear areas. Such work would concurrently benefit the laboratories' competencies for their nuclear weapons requirements. Ten years later, the three DOE defense laboratories have demonstrated the wisdom of Judge Clark's recommendation with many contributions to DoD requirements, especially under the auspices of the joint DoD/DOE munitions program.

As the DoD restructures and consolidates its research and development enterprise today, the Blue Ribbon Task Group's recommendation is more applicable than ever. The DOE defense laboratories can support the DoD laboratories and help extend the shrinking defense science and technology base of the United States. The science and technology base developed for our nuclear and past conventional defense activities are a resource to address the emerging threats of the 21st Century. Use of these capabilities by the DoD is an effective way to leverage the investments made in the nuclear weapons program for conventional defense. In turn, conventional defense programs at Los Alamos are a vital part of the Laboratory's portfolio, supporting and strongly complementing its nuclear national security missions. These programs are also a major contributor to our defense science and technology base.

We have organized our defense technologies portfolio based on technology and programmatic platforms to best support new DoD initiatives while meeting current commitments. We are building strategic partnerships with the military services and service laboratories, industry, and academia to support science and technology efforts.

Conventional Weapons Technology

Conventional weapons technology includes the Non-Nuclear Munitions Memorandum of Understanding, technology programs and projects in high-explosives, conventional weapons, lethality, and survivability for DoD applications. The joint munitions program supported by both DOE and DoD has been very successful. It was funded at $24 million in FY 1995, and is scheduled for the same level for FY 1996; this is a program that provides significant leverage and could easily be increased.

One example of this work is the armoring of C-141 aircraft. Based on the capabilities developed in our Armor/Anti-armor program, we were able to design and produce modular kits to retrofit C-141 aircraft

with cockpit armor. Five complete sets were fielded within eight weeks to protect the crews and critical systems of these aircraft as they flew peacekeeping missions in Bosnia. Other examples include new classes of insensitive high-explosives that are far less vulnerable to detonation in accident conditions; the development of new processes for the safe, environmentally sound demilitarization of energetic materials; and new, smart, adaptable warheads for multiple target sets.

Biological Warfare Agent Detection

The Desert Storm campaign clearly identified the inability of U.S. and Allied forces to effectively detect and identify biological-warfare (BW) agents as a critical military deficiency. Because of the low level of technology required to manufacture BW agents, and the relative ease with which they may be employed, our military forces could easily be confronted with the potentially catastrophic effects produced by these agents. Los Alamos was selected by DoD to pursue the development of innovative technologies for BW agent detection and identification. Drawing on our interdisciplinary skills in lasers, optics, information technologies, and engineering design, a light detection and ranging (lidar) system, designated the XM-94 by the Army, was designed, built, and tested by Los Alamos in a period of five months in 1993. The XM-94 is an order of magnitude smaller in size and weight and has substantially improved operational characteristics, compared to an earlier prototype BW agent detection lidar quickly fielded by Los Alamos during Desert Storm. As part of the DoD Counterproliferation Support Program, Los Alamos will build two military-engineered-and-qualified advanced prototypes based on the XM-94 concept, and transfer the technology to industry for production.

In a closely related activity, Los Alamos has also been tapped by the Army to exploit its expertise in sensors and biotechnology to develop a miniature flow cytometer (a technology that Los Alamos pioneered) for its Biological Integrated Detection System, which provides point detection and rapid identification of BW agents at forward deployment locations. Compared to current, off-the-shelf flow cytometers, the mini-system will represent a significant reduction in system volume, weight, and power requirements; operate in a semiautomatic detection and identification mode; and be designed and engineered for the military environment. This will bring the military's capability significantly closer to its goal of near-real-time, positive BW agent identification. Production beyond the initial test articles will also be transferred to an Army-selected industrial contractor.

Modeling and Simulation

Advanced modeling and simulation capability will allow the our military to "practice" an actual engagement scenario while varying tactics and weapons to determine an optimum approach that minimizes casualties and collateral damage, as well as providing a structured approach to procurement decisions and the evaluation of life-cycle costs.

Simulation is defined as macroscopic systems modeling for requirements, prototyping, procurement, test and evaluation, operations, and training, including man-in-the-loop scenarios. The full utilization of high-performance computing for modeling needs of the defense community, for simulation of agile manufacturing and process control, and for analysis of complex systems involves the use of scalable workstation resources linked effectively with high-performance computers.

Significant results with the 1024-node Connection Machine 5, vectorized codes on Cray machines, and connection to a network funded by the Advanced Research and Projects Agency and the National Science Foundation will enable Los Alamos to make major contributions to the modeling and simulation of defense problems. The object-oriented modeling of systems for global and theater missile defense, corps engagements, and satellite architectures has shown great utility for many defense simulation applications and can provide a framework for modeling advanced technology concepts and evaluating acquisition strategies.

Beams and Sensors

Los Alamos work encompasses particle, laser, and microwave beams and active and passive sensors. The primary emphasis in laser technology at Los Alamos in the near future will be on laser systems that provide frequency-agile sources, both continuously and discretely tunable, for defense-related applications such as biological warfare agent detection, missile defenses, lidar systems, countermeasures, and antisensor devices.

Recent advances in electronics, electrooptics, and computers are facilitating the development of highly capable, compact, active and passive sensors that support a wide variety of DoD applications, such as the use of lidar technology to detect biological agents and theater ballistic missiles and the use of passive threat-warning systems to detect spacecraft, aircraft, and land vehicles. Space environmental sensors and novel low-light level and multispectral imaging sensors developed for nonproliferation and counterproliferation missions are also applicable to DoD needs.

Advanced Concepts

Advanced concept technologies encompass a broad range of projects. Advanced materials for specific applications could be developed that have unique properties such as strong absorption of specific frequencies of electromagnetic radiation. Hypervelocity interceptor missile technologies could enable boost-phase interception of theater ballistic missiles. Other technologies include capabilities and systems that support peacekeeping, low-intensity conflicts, and special missions, those that provide the military and policymakers with flexible options; and novel energy storage systems and beam sources.

Summary

In the past, the DoD put considerable reliance and investment in its science and technology base to provide top-flight weapons systems to our armed forces. Examples include stealth technology, precision-guided munitions, and global positioning systems. With reductions in defense budgets and increasing demands for operational readiness, this investment in the future is at risk.

Moreover, recent changes in DoD procurement practices and restrictive interpretation of authorization and appropriations language have had a negative effect on the DoD's and the Services' ability to leverage and access the science and technology expertise resident in the DOE defense laboratories. We would advocate new approaches to incorporating the DOE defense laboratories in the DoD science and technology base to ensure the provision of innovative solutions for the future force structure and to help maintain the technological superiority of our defense.

DEFENSE MISSION SUMMARY

Los Alamos is well positioned to serve the nation in this new world. Of the seven nuclear systems that will remain in the U.S. nuclear arsenal after the turn of the century, Los Alamos designed and engineered five. However, the scientific challenge of ensuring the stockpile beyond its design lifetime and doing it without nuclear testing is greater than was the challenge of designing new weapons. At Los Alamos, we have the most complete set of facilities to help support the stockpile of tomorrow. We have a history of technical accomplishments and facilities to help manage the nuclear materials, and we have turned our considerable expertise in chemistry, engineering, and life sciences to addressing the daunting problems of the environmental legacy of the production complex. We are working closely with Livermore and Sandia laboratories to provide the nation with the best technologies to prevent and respond to the proliferation of weapons of mass destruction. We have made significant progress in developing a cooperative working relationship with its counterpart laboratories in Russia to address worldwide proliferation concerns.

So, *reducing the nuclear danger* will be a compelling central mission for Los Alamos for the foreseeable future. This mission will require that we keep excellent, experienced people committed to these challenges and that we maintain and modernize our facilities. We must also maintain excellence in several core technical competencies that cannot be supported entirely by our core mission activities. Programs in civilian science and technology, whether directly funded or performed in partnership with industry or universities, help maintain the competencies needed by our core defense mission areas while at the same time contributing to broader national goals.

II. CIVILIAN SCIENCE AND TECHNOLOGY

For this Laboratory to perform its defense missions, the strength and reputation of its scientific and technical capabilities must be maintained. The challenge of assuring a safe and secure nuclear deterrent, particularly in the absence of nuclear testing, requires a diverse scientific and technical environment. In a stringent budget climate this entails access to skills and technologies beyond those that can be supported solely for the national security mission. Civilian research programs now supported by other Department of Energy offices such as the Office of Energy Research, as well as work for other federal agencies, and partnerships with industry, help support necessary defense capabilities. Further, maintenance of the quality of the Laboratory's work requires that the Laboratory's scientists be integrated into the broader scientific and technical community.

I view work in civilian research and development as being vitally important to the Laboratory. *First*, there are direct benefits to working in these areas that accrue to the Laboratory. The intellectual challenges brought by civilian research and development often provide the necessary dynamics for development of technology for mission applications. A *second* reason for the essential character of civilian research and development is the need for the Laboratory to continue to attract the best scientists and engineers. Work in these fields helps provide the level of challenge needed to recruit a world-class staff. I am concerned that we may find it difficult to maintain the competencies necessary for the performance of our core defense mission if that mission is interpreted too narrowly. Civilian research is therefore a strong supporting component to the defense mission of the Laboratory.

BASIC RESEARCH

Basic research has long been a central feature of work at Los Alamos. It has served to inspire young scientists to come to Los Alamos, and it has helped retain some of our most productive senior people. A healthy basic research program also helps keep a focus on science and enhances the reputation of the institution for excellence. Basic research, exemplified by the first detection of the neutrino by a Los Alamos team in 1956 and our recent research on the mass of the neutrino, is essential to our defense mission. Research in materials using spallation neutrons at the Los Alamos Manuel Lujan Jr. Neutron Scattering Center (LANSCE) will support the defense mission as well, leading to greater understanding of stockpile stewardship issues, new means for tritium production, and perhaps to new ways to rid the nation and the world of long-lived radioactive wastes. The multiprogram nature of our Laboratory must be maintained if we are to continue to perform, much less excel, in our defense mission.

The laboratory provides a base of support for many projects in basic research that have direct applicability to our defense mission. Work in theoretical astrophysics has long had close ties to our

weapons design capability. Research in the synthesis of novel materials; the interaction between radiation, both nuclear and electromagnetic, and materials; and in the properties of materials under extremes of pressure and temperature has produced direct benefits to our core mission.

One of the most synergistic facilities at the Laboratory for the last 25 years has been the Clinton P. Anderson Los Alamos Meson Physics Facility (LAMPF). As a national user facility, it brings scientists from all over the world to Los Alamos to perform experiments and interact with our staff, and sometimes join us as employees. The cross-fertilization that comes from interacting with these visitors is part of what keeps the Laboratory a vital and exciting place.

Neutron scattering is a basic tool for probing the structure and dynamics of condensed matter systems and is complementary to more conventional X-ray diffraction, microscopy, magnetic resonance, and structural probes. The use of neutrons as a probe in biological and materials science is growing worldwide, and the importance of neutron beam research facilities has been established by high level review committees, each stressing that existing United States reactors for neutron research are now over 20 years old and that new sources are urgently needed. When the LAMPF accelerator came on-line in 1972, it became a new source of neutrons for research, an activity enhanced again by LANSCE, which started operating from the LAMPF beam in 1985.

Basic research at LANSCE covers a wide range of topics in condensed matter physics, materials science, chemistry, structural biology, geology, and engineering. Static structure and atomic and magnetic fluctuations are probed in a variety of systems ranging from high-temperature superconductors to macromolecules that control muscle contraction. Scientists at LANSCE have concentrated over the past few years in developing techniques in scientific areas to which neutron scattering has not been applied in the past. As a result, the facility has a number of unique capabilities, including diffraction measurements at high pressure, neutron reflection studies of liquid surfaces, and studies of materials under shear. Neutron radiography has been demonstrated; this can provide an important non-destructive evaluation technique for nuclear assemblies, with microscopic resolution and unique isotopic selectivity.

With the medium-energy nuclear physics national user program ending at LAMPF after FY 1995, neutron research will become the focal activity for the high-power accelerator facility and will become an important element of the Laboratory's stockpile stewardship program. The $35M LANSCE Upgrade project, currently funded and underway for Phase I, will improve facility availability with a goal of running eight months per year at 85% reliability. Better access to LANSCE will be important to the institutional vitality of the Laboratory, as more scientists from around the world use its facilities and increase contact and collaborations between Los Alamos scientists and their peers from government, universities, and industries.

The DOE's plan to build the Advanced Neutron Source (ANS) reactor at Oak Ridge National Laboratory is shown terminated in the FY 1996 President's Budget because of cost. The identified alternative is an *accelerator-driven spallation neutron source*, such as that pioneered at LANSCE and the Argonne National Laboratory Intense Pulsed Neutron Source. However, LANSCE and its sister facility at Argonne are oversubscribed and underpowered with respect to future user demand. The Neutron Scattering Society of America, through its Pulsed Spallation Source Committee (PSSC) hosted by Lawrence Berkeley Laboratory, has laid out a roadmap for spallation neutron source development which relies on facilities and expertise at Los Alamos and Argonne national laboratories.

LANSCE can also become a higher-power operational prototype. The 1-MW accelerator provides the only beam near this power level in the United States for target development. For the research community, the prototype facility would be a source of neutrons that is at least equivalent to the reactor at the National Institute of Standards and Technology, and in some cases better than the world's best neutron research reactor, the 57-MW reactor in Grenoble, France. This test bed is projected to cost in the $50-100 M range and will serve the community well for 10-15 years until the next generation source (5-10-MW range) is on-line. The PSSC recommended the High Power Spallation Testbed at Los Alamos as an important component of the U.S. spallation neutron roadmap and is likely to ratify this decision even with the cancellation of the ANS. Thus the United States can, for a modest investment, develop a facility at Los Alamos that is equivalent to the best neutron source in the world until the major next-generation neutron facility is designed and built, a source that will have both defense and non-defense applications.

Energy and Environment

The Laboratory's capabilities in long-term interdisciplinary research and development, nurtured by our defense mission, can also be applied to other civilian research and development needs thereby leveraging both investments. I discussed our work for the DoD above as examples of mutual benefit to important national needs that in turn support our core nuclear weapons mission. The same is true for programs in energy and environment. In a broader view, energy security is also an integral part of national security; the potential for economic disruption that dependence on foreign sources implies has been demonstrated more than once.

Per-capita demand for energy can be expected to continue to increase worldwide. While there may be no immediate needs for new energy sources in the United States, development of high-efficiency, low-polluting sources should be pursued more vigorously. The form, value, and efficient use of energy in applications is as important as new capacity; therefore a systems approach to energy production and use needs to be taken. These activities can help sustain the developing world and make our own industry

more efficient and cost-effective. More effective energy technologies and integration of raw materials issues with product design and recycling considerations will also work to increase the effectiveness of our industrial base.

These issues are too complex and interwoven to expect industry to find solutions by themselves. Many promising technologies are sufficiently speculative that their development poses too high a risk for any industrial segment. The benefits from such work, however, accrue to the public, not individual firms. Success in these areas therefore requires a strong partnership between the federal government and industry, using all the technological resources the nation has to offer. Work at Los Alamos in a number of areas contributes both to new source exploration and the efficient use of energy.

An early example of this approach was the establishment in FY 1988 of the Superconductivity Technology Centers (STCs) at Los Alamos, Argonne, and Oak Ridge national laboratories. The centers' specific mission is to form partnerships with U.S. industry to expedite the development of high-temperature superconductor (HTSC) technology with commercial feasibility. These partnerships are industry driven (that is, they are based on research and development projects of joint interest to a company and the Laboratory) with industry bearing the full cost of its participation. The partnership concept benefits both government and industrial research and development programs and focuses on the timely introduction of practical HTSC devices into the commercial marketplace. The emphasis in developing these partnerships is on power applications of HTSCs, although the Laboratory does respond to strong industry interest in collaboration on electronics applications. Industry's positive response is expected to lead to an expansion of the STC program with increased DOE funding. The Laboratory uses its center as a model for industry/national laboratory partnering by extending the concept to other important strategic technologies.

The Laboratory also participates in the Natural Gas and Oil Technology Partnership program, which encourages the domestic natural gas and oil industry to use the scientific and engineering resources of the DOE laboratories to acquire new technologies for improved domestic natural gas and oil recovery. The domestic industry guides the research and development efforts proposed as part of this initiative. Costs of partnership projects are shared with industry collaborators.

The Advanced Computing Technology Initiative (ACTI), which is a major collaboration with the nine multipurpose national laboratories and U.S. industry, primarily the major gas and oil producers, aims to apply the high-performance computing capabilities at the national laboratories to assist in oil and gas explorations, reservoir performance simulation, and other extraction activities. I discuss this program further when I discuss how our scientists work with industry.

A greater emphasis on fundamental environmental research and development is also needed. Examples in which the Laboratory has demonstrated capabilities include

- Instrumentation, applied information processing, and monitoring technologies and integration.
- Global atmospheric and climate modeling and measurements; e.g., the understanding of the effect of greenhouse gases.
- Risk assessment considerations and methodologies.
- Modeling of complex industrial and demographic systems, e.g., transportation systems.
- Modeling and simulation of energy and environmental recovery processes.

In the past year Los Alamos has become one of the preeminent institutions in computer modeling of the earth's oceans. The original task was to make changes necessary to run a few ocean-circulation codes efficiently on the massively parallel supercomputers at the Laboratory's Advanced Computing Laboratory. Los Alamos scientists did much more. They made such substantial improvements to the numerical methods and physics that these codes now are ranked as the best in the world. This happened because of the legacy of the nuclear weapons design program. The years of experience with large fluid-dynamic computer codes and the large numbers of scientists expert in fluid flow and nonlinear dynamics, numerical methods, and computer science that the weapons design program has supported were easily able to make rapid strides in this non-weapons effort.

Today the Lab is running the most highly resolved ocean simulation (6-10 mile grid) with complete topography (continental margins, islands, and subsurface topography). Details of ocean circulation compare well with satellite observations. The Arctic Ocean is being included for the first time with sea ice physics. Two different codes are being worked representing two different numerical approaches. Plans are being made to couple one of these codes to a very powerful global atmospheric code offering the possibility of the best coupled ocean/atmosphere simulations of the climate. The use of these coupled models to study the effects of energy development in the Third World, for example the use of soft coal as a primary energy resource in China as it develops its economy, ties directly to our fundamental energy mission.

Similar results have come from the weapons program in the area of global atmospheric studies. In the mid-1980s, Laboratory scientists responded to requests for a substantial study of the so-called "nuclear winter" scenario. Much work was being done around the country on this subject, but none of it was conclusive. Los Alamos scientists made substantial modifications to a global atmospheric code originally developed at the NSF-funded National Center for Atmospheric Research. In about 18 months, working with atmospheric scientists from NASA's Ames Research Center, they were able to make fully 3D simulations of the response of the earth's atmosphere to massive loading of black smoke and soot. Their

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analysis showed the major mechanisms that would come into play, and at the special National Academy of Sciences meeting in Washington DC, Los Alamos scientists were the only ones able to show such results. A few years later this capability was used again to make predictions–a task done in only two weeks–of the effects on global climate from the then possible burning of the Kuwaiti oil fields.

Recent measurements and demonstrations conducted by Los Alamos in collaboration with a variety of other organizations have shown that lidar technology, developed by the Laboratory for verification activities, can be a powerful tool for measuring air quality associated with vehicle emissions. Experimental campaigns conducted in Mexico City, Mexico; Barcelona, Spain; and Albuquerque, New Mexico, have located sources of pollution, tracked the movement of aerosols, and located mixing-layer boundaries as a function of time and traffic conditions.

In a somewhat different category, natural disasters cost the United States over one trillion dollars annually. The ability to base real-time decisions on event simulations would significantly reduce the destruction of property and the loss of life. By combining predictive models with adaptive systems that enable the extraction of information from large, often noisy, low-confidence data; understanding the limits of predictability driven by the inherent sources of uncertainty; and by creating an environment that accelerates model building to ensure agile responses to developing conditions, Los Alamos could develop the capabilities to predict the rapidly unfolding future, provide guidance to manage emergencies, and develop strategies to optimize remediation efforts. This grand challenge computing problem would be tractable only at an institution like Los Alamos, where the high performance computing hardware is joined with extensive software, data analysis, modeling, and scientific expertise.

Challenges like these, as with our work in basic research, contribute significantly to the nation, thereby leveraging the nation's investment in the Laboratory, and help to support the science and technology base needed to succeed in our defense mission.

Work for Other Federal Agencies and Industry

In addition to the DOE's own programs, work for other federal agencies and industry, whatever the mechanism, also maintains and strengthens Laboratory capabilities which are required for the performance of its core defense mission while contributing to other national needs.

Work for other federal agencies and industry represents the principal application of the Laboratory's core competence and varied capabilities to national needs in a broader context and to a broader customer base. At the same time, the Laboratory must maintain its mission orientation and not become a "job shop" for industry or for other federal agencies.

The Department must recognize that part of its mission is the facilitation of the use of its laboratories by other federal agencies and by industry. The Department has a trustee responsibility to preserve the competence of the Laboratory as a *national* resource and should not impede the broader use of Laboratory facilities and expertise through the imposition of arbitrary taxes and added factors.

Department of Transportation: We are supporting the Department of Transportation under the Intermodal Surface Transportation Efficiency Act of 1991 in several ways. We are partners with the State of New Mexico, local universities, and Sandia National Laboratory in the New Mexico Alliance for Transportation Research. This alliance brings the research and development capabilities of the Laboratory to bear on infrastructure issues.

Los Alamos is also being funded by the Federal Highway Administration to develop new modeling and analysis capabilities for transportation system planning. We have developed a systematic approach based on principles of dynamic analysis rather than the traditional functional decomposition of transport systems. The Transportation analysis simulation system (TRANSIMS) architecture uses what is appropriate from the traditional process, while developing new and more powerful methods employing modern and newly emerging computing technologies, software technologies, simulation techniques, and analytical methods for complex dynamical systems.

The most important new capabilities offered by TRANSIMS are the integration of congestion and incident effects analysis, detailed air quality impact analysis, and intermodal systems analysis. A significant difference between TRANSIMS and traditional methods is the incorporation of a regional scale traffic microsimulation. Vehicle emissions data produced by the microsimulation is collected for mobile emissions source analyses and verification against atmospheric measurements.

National Institutes of Health: The multidisciplinary nature of the Laboratory and its strong capabilities in physical science and large-scale computing enable its scientists to conduct biological and environmental research programs not possible at academic institutions. The National Institutes of Health have drawn on these capabilities to establish at Los Alamos a number of programs including the National Flow Cytometry and Sorting Research Resource, which makes advanced flow-cytometric instrumentation available to the biomedical research community; the National Stable Isotope Resource, which develops new and efficient methods of incorporating stable isotopes into compounds of immediate use in biomedical research; the Genome Sequence Database, which contributes to an understanding of the role of genes and chromosomes in disease; and the human immunodeficiency virus/autoimmune deficiency syndrome (HIV/AIDS) database, which collects and distributes deoxyribonucleic acid (DNA) sequences and determines phylogenetic relationships.

The National Institutes of Health programs nicely complement the Human Genome Project which is funded jointly by DOE and the National Institutes of Health. Los Alamos has just finished a high-resolution map of chromosome 16 as one of the principal responsibilities of its DOE Center for Human Genome Studies work.

TIES TO INDUSTRY

Industrial interactions continue to be a key contributor to the scientific vitality of Los Alamos National Laboratory. I view working with industry not as an option but as a business necessity. To carry out our mission of nuclear weapons stockpile stewardship and stockpile management, we will increasingly have to integrate manufacturing and maintenance with research and development. We must learn the best practices of American industry which has made great strides in concurrent engineering and quality manufacturing in the past decade. In addition, we find a great deal of commonality with American industry in technology development—this is especially evident in areas such as high-performance computing, modeling, and simulation; advanced materials and processing; advanced sensors; environmentally-conscious manufacturing; optoelectronics; and chemical processing.

The Laboratory's collaboration with American industry has increased dramatically over the past five years. We can credit this increase to the 1989 National Competitiveness and Technology Transfer Act (NCTTA) and the Congressionally supported DOE Defense Programs Technology Transfer Initiative (TTI). The 1989 NCTTA provided the vehicle for effective interactions, the Cooperative research and development agreement (CRADA). The DOE TTI program provided the financial support for cost-sharing, collaborative research and development with industry where direct benefit could be demonstrated for DOE Defense Programs as well as for industry. The NCTTA provided sufficiently attractive intellectual property rights to the private sector to make cost sharing interesting to industry. In fact, these arrangements, and the dual benefits that accrue, encouraged the laboratories and industry to collaborate across a broader spectrum of defense programs, not necessarily limited to the TTI program.

At Los Alamos, we have just signed our 150th CRADA with a total multiyear value in excess of $350 million. The interest from industry continues to outpace our funding levels by factors of eight to ten. Just as importantly, we are finding enormous excitement among the Laboratory's technical staff for working with industry. We find that by selecting the technology and the industrial partner carefully, we can not only maintain but enhance the core technical competencies required for our defense mission. Furthermore, we have several cases where collaboration with industry in an area closely related to defense technologies allowed us to keep critical scientists and engineers in the weapons program.

Let me provide a few examples, to highlight both their contribution to our DP mission and their impact on U.S. industry:

We developed a new acoustic technique called resonant ultrasound spectroscopy at Los Alamos to evaluate material properties of high-temperature superconductors. That technology has now been further developed through licenses and CRADAs into commercial gear usable for a wide range of characterization. One company is now selling non-destructive testing instruments for applications ranging from improved ball bearing characterization (critical in predicting and improving lifetimes of rotating systems) to improved ceramic oxygen sensors for a major U.S. car company. These same acoustic technologies are now also being used for characterization of weapon pits at one of the Department's facilities. We anticipate that such improved acoustic technologies will be a key contributor to the requalification of weapon components to minimize the need for future production.

The Los Alamos technology base in geophysics and computational modeling has been applied to improved characterization of underground oil and gas reservoirs through improved collection and interpretation of seismic signals and better characterization of the permeability of the underground rock formations. We've further improved this industry's capabilities through work with a major oil field service company to significantly improve the use of well-logging tools. In this latter effort, we applied a class of radiation transport computer codes ("Monte Carlo transport"), developed at Los Alamos to predict the interaction of radiation with materials (important in nuclear weapons design), to improve the accuracy of well logging. Through well-logging, the structure of geologic strata outside the oil well casing can be measured and potentially oil-bearing formations localized. The Director of Research for Schlumberger Doll Research noted that "...the improvements will ultimately provide crucial capabilities required to develop new and improved logging tools and more accurate measurement interpretation, which translates into more economic recovery of oil and gas." Our defense mission also benefits directly from the improvements made in the computational physics capabilities and the development of improved user-friendly interfaces for the many Los Alamos applications of radiation transport codes, most of which have weapons applications.

With Amoco Oil Company, we expanded an important defense mission research area, the study of turbulent interpenetrating material flows, and improved our ability to simulate these flows more accurately with massively parallel computers. Amoco, for its part, is now able to design more efficient processing systems for residual oil and heavy crude. Through the new Advanced Computing Technology Initiative (ACTI), we will further expand the development of these approaches. For the industry, this can mean improved recovery by better relating seismic measurements and simulations to the parameters of each reservoir and well hole. ACTI projects also contribute to explosives technology, the speed of simulation codes, and database development. Department missions benefit from improved use of seismic signals to interpret underground disturbances, including clandestine nuclear detonations, and better tools for determining the safety of radioactive waste storage.

With General Motors we have had the opportunity to develop a novel idea for surface treatments of materials based on an invention at the University of Wisconsin. Surfaces of materials such as gears or dies are treated in a plasma generated with equipment that the Laboratory was able to bring together from its fusion research, weapons program, and strategic defense research. This Plasma Source Ion Implantation CRADA with General Motors promises to improve hardness and wear of industrial materials in an environmentally benign process, while concurrently opening up the possibility of improving materials for enhanced nuclear weapons safety and for decontaminating surfaces of nuclear process equipment at sites such as Rocky Flats.

Much has been said about having the DOE laboratories contribute to the competitiveness of American industry. The Galvin Task Force report cautioned that the laboratories should stay within their mission areas in forming partnerships with industry. Our experience over the past few years, drawn principally from the DOE TTI program where dual benefit to defense programs was built in at the planning stage, is that Los Alamos does indeed have much to offer to American industry. However, the real story is just how much the Laboratory has benefited from these partnerships. We have carefully examined our 150 CRADAs and found that all of the TTI Ç‰ÅÎÅs, which constitute the bulk of the 150, have dual benefits to our defense programs, with most of them greatly contributing to the core competencies required for our core mission of reducing the global nuclear danger.

Over the next few years we see the laboratories integrating their R&D in nuclear weapons stockpile stewardship with manufacturing. To be able to offer the nation the ability to manufacture whatever will be required in the future without having a large and expensive production complex in a standby mode, we will have to develop agile manufacturing techniques similar to those American industry is developing to stay competitive in a global market place. In the future, small numbers of a variety of remanufactured weapons and/or components will likely be needed, and this will require a highly flexible manufacturing capability with the highest quality assurance standards. Hence, we see future cooperation with industry becoming more focused on providing benefits for the nuclear weapons program. In some cases, we can work cooperatively with U.S. industries to develop manufacturing capabilities that will not only enable future weapon component manufacturing, but also advance the state-of-the-art in the manufacturing sciences crucial to U.S. industry. We have found the CRADA mechanism and the TTI funding channel a very useful way to encourage this truly mutually beneficial arrangement. I encourage the Committee to continue its support of this effort.

III. THE GALVIN TASK FORCE REPORT

The task force report is the result of a thorough examination of the laboratories. This examination encouraged the laboratories to examine themselves in new ways. In fact, one of the positive outcomes of the process of the task force is that the laboratory directors now communicate and coordinate their activities more closely than ever before. I view the report of the task force more as a beginning than an end. The report will be one of several inputs to the White House National Science and Technology Council as it considers the future of the major federal laboratories this spring. As indicated by this hearing, Congress is also keenly interested in following up on the report because it deals with programs, budgets, and governance—all areas of great interest to the Congress. Nevertheless, I will reserve my comments on the report primarily to those that directly concern Los Alamos.

We find strong support in the report for the Los Alamos core mission of reducing the global nuclear danger. The task force strongly endorses the need for science-based stockpile stewardship in the absence of underground nuclear testing. Specifically endorsed are the needs to attract and retain skilled scientists and engineers; to enhance surveillance of weapons; to re-analyze previous test data by using advanced numerical simulations; to sustain the scientific process of inquiry through experimentation; to support the Dual Axis Radiographic Hydrotest Facility (DARHT) to continue hydrodynamic testing; to utilize the Los Alamos Manuel Lujan Jr. Neutron Scattering Center (LANSCE) for neutron radiography; and to support research programs such as advanced computing and accelerator concepts for producing tritium. In addition, the report is consistent with our laboratory playing a strong role in nonproliferation and counter-proliferation, the safe tracking and disposition of fissionable materials, and cleaning up the legacy of 50 years of nuclear weapons production.

The issue of civilian control of nuclear weapons activities has been visited and revisited frequently. From the Atomic Energy Act of 1946, civilian control of nuclear weapons research and development has been a bipartisan mainstay of U.S. policy, a policy reiterated in the formation of the Energy Research and Development Administration and the Department of Energy. This suggests that, while the world situation has changed, a transfer of the weapons program to the DoD should not be approached lightly.

In 1985, the President's Blue Ribbon Task Group on Nuclear Weapons Program Management I already mentioned was directed to review the question of fiscal responsibility in the nuclear weapons program. As a result of extensive studies of the costs of the nuclear weapons program, the Task Group concluded that funding responsibilities for DOE's nuclear weapons activities should *not* be transferred to DoD and that the disadvantages of such a transfer would more than offset any advantages.

The Galvin Task Force came to the same conclusion, finding *"...no compelling reason for DoD to manage the national security activities at the weapons laboratories. Indeed, the Task Force believes that there is much value at this time in maintaining an independent and technically expert organization to focus on nuclear stockpile issues and to continue to ensure that decisions regarding the safety, control, and stewardship of nuclear weapons are raised to the high policy level that they deserve."*

The task force also finds that "basic research is necessary to support their core missions ... that it is necessary to attract the most talented people to the laboratories." The report expresses concern over what appears to have been a significant decline in Departmental funding for fundamental research over the past three years. I share this concern as I expressed above.

The task force is also supportive of the Department's missions in energy and environment. The report states, "there is a long list of exciting, challenging, and vital areas of research and technology development that constitute the appropriate energy agenda for the laboratories." The task force calls for greater attention to the energy mission by the laboratories in conjunction with collaboration with the private sector. It specifically calls out a need to support industrial ecology. We must demonstrate how Los Alamos can make very special contributions to the nation's civilian agenda because of the strengths and synergism arising from our defense mission.

On the matter of working with industry, the task force provides some cautions to avoid making economic competitiveness a principal mission of the laboratories. I agree with many of the concerns of the task force, however, I want to ask this Committee not to indiscriminately cut back the laboratories' industrial collaborations. As I hope I have already impressed upon you, working with industry allows us to stay sharp technically and to provide leverage for the federal research investment in our programs and institutions.

The task force was also asked specifically to address the size of the laboratories. It does not recommend closure of any laboratories. However, it rejects some of the current arguments for the need for two competing nuclear design laboratories, calling for consolidation of key nuclear weapons functions at Los Alamos over the next five years. These recommendations will have to be reconciled with the Department's Defense Programs vision and roadmap of the future weapons complex.

The task force also stated that it "believes that the national laboratory system is oversized for its current mission assignments." Several contributing factors are mentioned, including current management inefficiencies at the laboratories and the Department, excess capacity associated with nuclear weapons, and politics that make it difficult to downsize or restructure. Although I certainly agree that improvements in governance and a sharpened mission focus for the laboratories will yield significant productivity

improvements and will allow for somewhat smaller laboratories, along with significantly fewer government oversight personnel, it is critical that we focus first on function and then on size. The 10 laboratories reviewed by the task force currently constitute approximately one-third of the Department's budget. It is imperative that the Department develop its missions and the roadmaps to accomplish those missions and then size the laboratories accordingly.

For example, the current Defense Programs vision and roadmap anticipates a smaller, less costly overall defense complex in the future. However, to achieve this vision the defense laboratories would have to assume additional tasks within the overall complex. The Department should develop similar roadmaps for energy and environment, cleanup, and science. In addition, work for other government agencies must be strategically incorporated to provide the proper synergy with the Department's missions. Congress can help by encouraging the Department of Energy to take this approach to effectively size the laboratory system.

The report leaves little to the imagination on the subject of DOE's oversight and management of the laboratories with the statement, "the current system of governance of these laboratories is broken and should be replaced with a bold alternative." I applaud taking a fresh look at the governance of the laboratories. Over the years the laboratories have been pushed toward *the federal norm* in many of their business and operational practices, consequently losing much of the flexibility and independence that were the hallmarks of the GOCO (government-owned, contractor-operated) system of governance.

The corporatization model proposed by the task force has certain initial appeal. However, the versions I have examined so far do not appear as attractive as fixing the GOCO system. The major changes outlined in Appendix B of the report aimed at fixing the GOCO system would go a long way to remedy what the task force saw as "operational inefficiencies and demotivational consequences" of excessive oversight and micromanagement.

I am very encouraged by the Department's response (as outlined in Secretary O'Leary's testimony to the Senate Committee on Appropriations on February 28) in addressing the governance and oversight issues. Such actions, along with developing specific roadmaps for the civilian and science missions of the Department would greatly enhance the value of the Department and its laboratories to the nation. I urge strong congressional support for such actions.

As to what the laboratories can do, we must continue to improve our operations and business practices. The standards that the Galvin Task Force have in mind are not lower than those practiced now. We must be scrupulous in protecting the health and safety of our employees and the public. We must comply with federal and state laws and regulations. We must demonstrate responsible fiscal and property management. Management improvements would be targeted to focus on effectiveness and product, not on

administrative process. We must continue to benchmark our operations and practices against the best-in-class. Only then can we hope for a world with fewer audits and greater flexibility. Further, we must continue to work together more cooperatively as a *system* of laboratories, teaming as appropriate with universities and industry to meet the science and technology needs of the nation.

To sum it up, the task force makes some excellent recommendations on how the Department of Energy and the laboratories can enhance their contributions to the nation. I view it as a positive beginning for the next phase—making it all happen.

IV. SUMMARY

The great strength of our Laboratory is the quality of the science and technology it is able to apply to its mission of *reducing the global nuclear danger.* Indeed, the Laboratory's identity and international recognition rest upon its sustained excellence in satisfying national needs in science and technology. For its entire existence, the Laboratory has been large enough, with sufficient resources and depth, to carry out its defense responsibilities. I want to reiterate the themes on which I began this testimony.

- We are the caretakers of the nation's nuclear stockpile, and we fully recognize the responsibility that that mission entails. We also acknowledge nonproliferation, nuclear materials, and environmental cleanup responsibilities.
- We need help to arrest the continuing erosion in our competencies. In addition to strengthening support of our defense programs, we must retain the people and maintain the facilities needed for our defense mission by wisely leveraging our activities in conventional defense and civilian research and development.
- We need help from Congress and the DOE to implement the changes called for in Appendix B of the Galvin Task Force Report. Without these changes we will price ourselves out of business.

Los Alamos has served the nation for fifty-two years. We are prepared to face the new challenges of a different era. I appreciate the continued support that this Committee and its predecessors have given the Laboratory.

Mr. HUNTER. Thank you, Dr. Hecker. And thank you to all three gentlemen for your opening statements.

I had a chance to review the Galvin report—the Galvin report has got some fairly scathing criticisms of DOE and of the labs themselves and the internal practices of the labs. And I wanted to give you a chance to comment on those, maybe in a broad way, but if you have any specific things you wanted to talk about. Let me just ask you, you are all familiar with the Galvin report, more familiar, perhaps, than you wanted to be. The first aspect of the Galvin report I think goes to something that you have all talked about, and that is the need to recruit outstanding minds to the labs, which has been I think part of the genius of the labs in the past. We have had the best people, the smartest people in the country doing these things, and that is why we have stayed ahead of the rest of the world.

The essence of the Galvin report with respect to the interaction between the Federal Government and the laboratories, is that the DOE has become a monster in terms of micromanagement, report requiring, bureaucratic disconnect, and kind of an overbearing micromanagement that has tended to disempower, if you will, the creative people at the labs.

In my experience, if you want to attract smart folks, you need to empower them. You need to be able to bring them into an environment where if they have a good idea, that good idea will be something that they can pursue without looking over their shoulder constantly in Washington to make sure that Washington has a requisite number of reports and is satisfied the requisite number of bureaucrats have gone through the requisite number of hurdles.

Do you agree, first, with that basic concept, that DOE has become a micromanager and that that has produced waste and inefficiency, and that the labs—and do you agree with Mr. Galvin that the labs need to be empowered, if you will, and some of that micromanagement at DOE's level has to recede? A basic observation on that. I am sure you have thought about that.

Mr. NARATH. I am in basic agreement with the conclusions as you have stated them, Mr. Chairman. I think it is important, though, to look underneath the surface and also recognize that even DOE knows there are things that have to be fixed, and is quite actively pursuing solutions to the problems.

I think it is also fair to say that what DOE—the relationship between DOE and the laboratories is in large measure—it is my opinion, now—a reflection of societal attitudes. I mean, we have as a society become risk averse, we seek perfection in everything that the Government does. I mean, you must be as painfully aware as I am that it is very difficult for anyone associated with the Government to please the public these days.

So I think there is a lot of distributed blame in this situation. Perhaps what we need to focus on is how to fix the situation and put things in reverse.

Mr. HUNTER. Do you have any proposals with respect to that?

Mr. NARATH. Yes. And I think my two colleagues will support this as well. I believe that a fundamental solution can be found in implementing the task outlined in appendix B of the Galvin report.

Mr. HUNTER. OK. And what does that do?

Mr. NARATH. First of all, it places more accountability in the laboratories. It more clearly—it will more clearly define what the headquarter's functions are. It will delegate to the laboratories those things over which they should really have control.

It will increase efficiencies, both within DOE—I mean, right now we are faced by a system of directives that have come out of DOE that tell us in exquisite terms not only what to do but how to do it. You do not hire contractors, be it the University of California or Lockheed-Martin to manage a million dollar enterprise and then tell them in great detail how to exercise fire extinguisher training. You just don't do that.

Mr. HUNTER. Do you think this is a little bit comparable to our acquisition system where we have a tremendous oversight to the cases where you have hundreds of uniformed people in the plants overseeing the construction?

Mr. NARATH. Very much the same.

Mr. HUNTER. Would you recommend cutting out a lot of these DOE officials who are involved in that exercise?

Mr. NARATH. Well, I am going to pass the microphone in a second, but I would not volunteer, not having—I have my own problems managing my laboratory.

Mr. HUNTER. I understand.

Mr. NARATH. That is a big enough challenge. I don't pretend to know the answer to how DOE ought to manage itself more effectively. But clearly, there needs to be a restructuring within DOE, streamlining. I think DOE is doing that.

The directives need to be made more performance oriented, less compliance driven, more performance driven. Put the accountability out where it belongs. Tell me what you expect in terms of performance and then punish me if I don't perform. Don't tell me how to achieve that performance level.

With that, I turn to my colleagues.

Mr. TARTER. Another way of capturing some of the content of appendix B is to say we ought to simply live by the law of the land, not by the law especially designed by DOE. I think that means operating by OSHA standards, by the general laws set up to govern the way people do work every place else in the country. And I think we live by commercial practices where appropriate, by the Nuclear Regulatory Commission practices, things which many years ago might have seemed somewhat odious to us, I think we would all adopt standards and greatly improve that.

To speak to your second point, and I think one of the things Mr. Galvin said in all fairness, is that it is not simply this DOE or anything else. There is an accrued legacy that goes back over a decade or two from which these problems result. But to speak very precisely to your point, for the individual scientist in the laboratory, the number of times they have said this just can't be true and you try to explain why this is true to them, it is no longer just an irritation. It is a fundamental problem. And I think it will cripple the laboratories if it basically isn't changed.

Mr. HUNTER. Do you think we waste a lot of money and time complying with regulations, requests for reports, bureaucratic interaction from DOE in the labs?

Mr. HECKER. Yes.

Mr. TARTER. No question. It is just overwhelming.

Mr. HUNTER. Dr. Hecker?

Mr. HECKER. I also agree with the comments that you made. And in fact, as I look at the challenges of the past 5 years, one of the grand challenges we have had is adjusting to the end of the cold war, and what do we do now.

I actually found this other challenge, that is, how do we get around the stifling government bureaucracy as a greater challenge for us? I think we can more easily meet the end of the cold war than that challenge. So the magnitude of the problem is precisely what Mr. Galvin pointed out. It is really overwhelming.

As my colleague said, it is not just DOE. There are a lot of people that can take credit for that, including us at the laboratories.

We have set up bureaucracies at the laboratory, you know, to essentially try to shield us from the bureaucracy of the government. We can both, both the laboratories and the Department of Energy, can do with a lot fewer checkers than we currently have.

So I think we can be much more productive. We have tried to go out and learn from the private sector, from the Motorolas and the Millikens as to how you do quality in your organization. Now we need the Government's help, and Mr. Galvin put his finger right on the issue.

Mr. HUNTER. Let me ask you to follow up on that. You gentlemen are the leaders of the labs. Have you given a stern warning to the DOE, or a cry for help, or a, damn it, let's stop this thing, and we will have to readjust or reorient?

What has been your communication to DOE? Obviously, you are all aware of this problem, that the bureaucracy is strangling it. What are you doing about it?

Mr. HECKER. The answer is yes, we have gone to the Department of Energy. I personally have done it repeatedly over the last 5 or 6 years.

However, as we have pushed on the Department of Energy from one end, there are certain elements of Congress that have pushed on the Department of Energy from the other end. And so we have made very little progress until essentially during the course of the Galvin Task Force process, where in response to Mr. Galvin laying these problems out, the Department has been enormously more receptive than ever before. I also found Congress, I think, more understanding to where it would allow the Department of Energy to make some of those changes that the private sector has made some number of years ago.

Mr. NARATH. I could take you back to December 1991. The Secretary of Energy and I met at an off-site meeting in Washington. It was at that time that the labs and DOE first confronted, I mean big time, this issue and made some commitments on both sides. The labs committed to improving their efficiencies, and DOE at that time stated that they would revisit the directive system and look at the excessive oversight.

Now, how much progress have we made since then? Well, perhaps we needed an outside voice like Mr. Galvin's to really stick the needle into the system.

Mr. HUNTER. What would you, if you were going to legislate this year with respect to this problem, what would you do?

Mr. NARATH. I am not sure it requires legislative action. I would encourage the Congress, however, to look at the environmental laws that you have passed and see to what extent some of those might be tuned up to——

Mr. HUNTER. We are going to do a monster review of the environmental laws, especially with respect to the cleanup. But I am talking about the bureaucracy, the reporting requirements, all of the micromanagement that DOE is exercising with respect to the labs, which is not necessarily the result of environmental laws.

Mr. NARATH. I would suggest——

Mr. HUNTER. At least Galvin doesn't say that.

Mr. NARATH. I would suggest that Congress, through its various committees that have jurisdiction over DOE activities, give a strong endorsement, give strong encouragement to implement the provisions.

Mr. HUNTER. The gentleman from California, Mr. Dellums, at any time I am asking questions, feel free to jump in, too, because it is kind of a unique opportunity we have here to discuss this.

Mr. DELLUMS. I find playing off your questions interesting, too, Mr. Chairman. First, a brief observation, then I would like to go to a couple of questions.

I am not sure our generic knowledge as the framework for congressional bureaucratic overlay is much better than a sophisticated scientific professional overlay that is part of the Department of Energy's background, is any better than that. So when you said legislate, that made me bristle a little bit.

Dr. Narath, when I asked you the question, I was simply trying to hear, it was nothing more than that. But I would like to ask you and all of your distinguished colleagues, when you use the term nuclear weapons program, just for the record, what are you talking about? What operates as the parameters of the nuclear weapons from your perspective, so we are all talking about the same thing?

Mr. NARATH. When I talk about the nuclear weapons program, I talk about all nuclear weapons-related activities supported sponsored by the Department of Energy, and that includes principally the nuclear weapon research and development activity, stockpile support, but also extends to things like analysis of intelligence data, the nonproliferation work and so on.

But at the core is the nuclear weapon R&D activity. I should have mentioned production as well.

Mr. DELLUMS. Producing new nuclear weapons?

Mr. NARATH. No. Well, let's see. Let me be careful how I answer that.

As we indicated earlier, all the weapons in the nuclear stockpile are likely to reach, for all intents and purposes, end of life by the Nation will turn its back on nuclear weapons as an instrument of strategic deterrence.

Therefore, it is just a logical necessity that at some point we will have to rebuild weapons. At that point, we will have to decide whether they will be exactly the same weapons, modified. Personally, I don't believe we will ever rebuild weapons exactly as they were originally designed. I mean, all of the electronic, electromechanical, materials, and so on, in these weapons, it is 1970s' technology. Much too expensive.

So yes, at some point we will build new weapons. But they may be old designs. Certainly the labs, not even DOE, generates the requirements. That comes out of the Department of Defense.

Mr. DELLUMS. Gentlemen, do you concur in that?

Mr. TARTER. I guess I have—it is perhaps semantics, but when I described the laboratory's program and the sort of 1-minute approach to it, I usually characterize a significant fraction of the laboratories as working on national security issues. And to my mind, national security is perhaps the right general characteristic, and within that there is work on the nuclear weapons program which to me pretty much means work funded by the DOE, but also includes DOD and other things related to that. But I generally use national security as the umbrella term and nuclear weapons as the specific piece funded by DOE.

Mr. HECKER. Mr. Dellums, the place where your question becomes extremely important is when we talk about, for instance, I had mentioned we have lost half of our people in nuclear weapons research and development over the past 7 years. There I am talking about a very focused piece of this core program that Mr. Narath mentioned, not the entire nuclear weapons activity of the Department of Energy.

That is extremely important. And so for what we used to call nuclear weapons research development and testing, the RD&T line, we have lost half of the direct people from about 2,000 to less than 1,000 over the past 7 years.

However, if I add arms control verification, nonproliferation, the stockpile support activities and the cleanup activities, if you take all of those as being part of the defense account in the Department of Energy, then that total loss of manpower has been much smaller percentage-wise. And, in fact, about a thousand people that we have lost is essentially what we have lost from that total at the laboratory.

So it is a very important distinction for us to make. It is not that our laboratory is half of the size. It is only that core program is half of the size of what it was.

Mr. NARATH. I would like to amplify that. I am glad you asked the question. I am glad my colleague identified the crux of the matter.

My biggest concern, as is true with the other labs, is what happens to the nuclear weapon research and development line, because it is that budget that supports the technical foundations.

If you take that away, then the lab becomes ineffective in doing everything else. The fact of the matter is that in recent years, we have taken on a whole lot of very implied things, many peripheral to the core concerns of the program.

They all feed off that nuclear weapon R&D capability. Yet that piece of the budget has been in free-fall. Sig Hecker has been absolutely correct. If you look at the total numbers, it doesn't appear as if we are suffering.

Mr. HUNTER. Will the gentleman yield on that?

Mr. DELLUMS. I yield to the Chairman.

Mr. HUNTER. Notwithstanding the gentleman for yielding, I think you have opened up a very important area here. Another major point of the Galvin Commission is that in their estimate, and

I would quote them here, they find that there is excessive scrambling by the laboratories to establish programmatic activities in, quote, "new mission areas, at the expense of missions focused on traditional assignments in fundamental science."

What they seem to be saying is, in a way, you are saying the same thing, that you need to have the basics, one of which is weapons R&D, and that the complex is founded on that. The comeback from the Galvin Commission is that you folks have been involved to some degree in shopping in new areas, and as they say, excessive scrambling for new mission areas.

Would it be fair to say there hadn't been an integrated laboratory focus on the basics in recent years?

Mr. NARATH. I take some exception to that part of the Galvin report, in fact, I take very strong exception. But I need to say that——

Mr. HUNTER. They were talking about the other labs.

Mr. HECKER. That was going to be my answer.

Mr. NARATH. You knew exactly what I was going to say. But in truth, there is no such thing as a DOE laboratory. We are all different. We are different by virtue of our history, our current assignments, and so on.

I can tell you that at Sandia since 1990, we have been very diligent in developing and executing strategies. We are getting better at it. I can't help it that the nuclear R&D budget has been plummeting. The peripheral work we have taken on in the nuclear weapon program was not something that I scrambled to attract. I did not lobby DOE to take on production responsibility.

In fact, it is my concern that in taking on a lot of production, that I will dilute the technical content of the laboratory, and if I don't watch it in the long run, Sandia will become converted from an outstanding world class R&D institution into something that is quite different.

Mr. TARTER. Maybe I can make one comment to amplify. I think—and I would have to ask them individually, but I think to some extent the Galvin comment or the report's comment was in response to the identification early on by the Department of Energy and by certainly some people within the laboratories of trying to make driving the economic engine of the country a major new mission. That took a lot of flavors and a lot of forms.

It was something which I think had a lot of interest, and I think what we all learned, each because of the different cultures in the labs, and I think Dr. Hecker already has expressed it, and so has Dr. Narath, we learned that working with industry was a very effective and efficient way to do some of our jobs, but it is not a major mission of the labs.

I think we all reached that simultaneously with the Galvin Commission, but I think that remark remained as a residue of the early interactions.

Mr. HECKER. I would also like to comment on that, because it is a very important point. And I also take issue. I think at Los Alamos we have a very focused mission. We have defined this as reducing the nuclear danger. The components we talk about is the core central mission. We have said that by itself won't cut it.

So, in fact, I would like to have the Government make it easier for us to allow us to contribute in certain areas, specifically chosen and well-focused, that will help to underpin those capabilities, so that this free-falling R&D budget we have helped to shore up by doing other things like global ocean modeling—and we have been able to make some really salient contributions to global ocean modeling, and at the same time, keep the sort of capabilities we need in the nuclear weapons program.

I think the goal should make it easier for us to do that rather than harder for us. We have put together very good focus strategy. However, a lot of the people that looked at us from the Galvin Task Force were folks from industry.

I spent some years at General Motors. And I can appreciate, they looked at our overall budgetary process and how we get our budgets, and in the way that we have to deal with the Federal Government, through the Department of Energy and with Congress, you know, that is not a system that is easy to describe to an industrial person.

I mean, it doesn't have great certainty. It has a lot of your poker, you know, playing sort of, roulette wheel problem. And so it is difficult for us to clearly define up front, since we have to work through the congressional process.

So they may look at us as casting our notice somewhat more broadly than you would in industry. But I maintain that we have a very good idea of where we want to go, and it really supports and helps the country's nuclear weapons program.

Mr. HUNTER. I thank the gentleman for yielding.

Mr. DELLUMS. Sure.

I would like to follow up on that, Dr. Hecker, because you mentioned that reducing nuclear danger is important, but not enough, and you talked about providing the capability to move into other areas, dual-use technologies, scientific, environmental ventures that allow to us maintain the base of scientific competence.

Before I go to that, let me ask, why is it not enough, reducing the nuclear danger?

At one time, you folks were a hybrid; part scientist, part demolition expert, as it were. Now, in the post-cold-war world, you are almost totally scientific. It would seem to me that that would be a higher order of challenge.

Now that almost 100 percent of the challenge that you confront is really a scientific challenge, it is not building a weapons system out there. Why would it not be an incredible challenge to figure out how to undo what was done or at least reduce the level of tension and stress to a point where our children's children may not have to confront this danger? And I am just asking the question as a layperson.

Why would not developing greater treaty compliance capability not be an exciting technological challenge? Why would not confronting the significant problems of proliferation and counterproliferation not be a significant challenge?

Why would it not be a significant challenge to figure out how to disarm the weapon capability, the nuclear weapon capability out there in the world? I think that goes in the direction of treaty compliance or whatever.

But why wouldn't that be an incredible challenge to figure out how to undo what was done? Why would that not be a technological challenge to a scientist to figure out how in the hell to go the other way?

The second question it seems to me is an observation. You might respond to it. My colleague and I were chatting about this.

It is like going from inside out and now outside in. At one time you are inside building nuclear military capability, and you are exporting some of that technology out commercially. Now, I hear you saying, go outside and develop these nonmilitary capabilities so that you have a reservoir of scientific and technological capability that if down the road you needed it militarily, you could use it.

So it seems to me the world has turned around, if I am incorrect—well, just comment on that observation. But first I would like you to go to why it would not be a significant challenge to move expeditiously to deal with the issues of treaty compliance and proliferation and nonproliferation. Why would that not be a great enough challenge?

Mr. HECKER. Let me actually answer your second one first, because it is a much quicker answer, if I may. And you are absolutely right, the way that I view it, the arrows now point in both directions. They used to point principally out, and that is, the nuclear weapons program bought us the biggest computers in the world, and so we were able to contribute to other things like the human genome project, for instance, or many other things.

Now essentially we need the arrows to point in as well. So yes, the world has changed, where the arrows point in both directions.

On the first one, you have made a very fine observation, and, in fact, you gave a beautiful speech of why it is a challenge. But there are two aspects there. Say philosophical aspect and there is a pragmatic aspect. And philosophically, your comments are right on. I think it is easier today to get people to come into this challenge, you know, when we talk about needing to reduce the number of weapons around the world, of working scientifically in collaboration, you know, with our erstwhile enemies over at Azimas in Russia, actually one of the thoughts I had, now that we started learning how to work with them, eventually we may learn how to work with Livermore as well.

But——

Mr. TARTER. It is a reach.

Mr. HECKER. At any rate, philosophically, it is an enormous challenge. Pragmatically, though, it has a problem. That is, in the earlier years, when we were, say, designing bombs, and the stockpiles were going up, the level of support at the laboratories was superb.

One of the things that attracted, let's say, the astrophysicists to Los Alamos, is they did have the world's largest computer and it looked like they were always going to have the world's largest computers. Stability was there, the security was there, the best of the best was there.

Now these same smart people look in and they look at the R&D budget that I mentioned, and it has been in free-fall, and so they said, why should I get into a program that is dying? And so the pragmatic support isn't there.

So unless we can turn that around, and then couple it with the philosophical challenge—so what we have done instead is to make sure there are other challenges that I identified, and particularly what we find important at Los Alamos, and I am sure my colleagues feel the same way, at our laboratories you want to have projects that have a visibility on the university campuses, that attract the faculty from those campuses to come and visit your laboratory. And then once they do that, they will send their best graduate students. They will come back as post-docs. And those are the people that make up the future of our laboratories.

If you don't have those kind of magnet programs at these laboratories, you will not be able to have the smartest people that you need to do nuclear weapons program.

So it is that combination. It is a combination of philosophically, your comments are right on, but from a pragmatic, right now this program suffers from that free-falling budget. That is my impression.

Mr. TARTER. Perhaps, I could give one short anecdote about a person. And any anecdote is only as good as that particular sample, but we had an individual now in his 30's who came to the laboratory about a decade ago, and who has done several spectacular things.

He—again, what triggered it was Sig's comment about the astronomy part. He is a gamma ray astronomer. He likes to measure gamma rays in space. Very successful. He was brought to the laboratory to do part of that work. He also received very substantial NASA funding for a mission both by the European Space Agency and the Russians, and he was running a very large group.

Then he had some clever ideas, detecting weapons in a proliferation sense, using the same gamma ray detector, looking down instead of looking up. He got an even bigger group, incredibly bright individual. He has now gone to Columbia University for two reasons: One is because in his late 30's or early 40's, even though it seems wonderful right now, and he is very successful, can this be a career, versus some place else? Because when he looks at the Government in the broad area, he is not sure that commitment is there.

The second reason is the comments you mentioned, that the regulations got to him. And both those things, he is one of the outstanding people across the broad spectrum, the best—a scientist, an applied person with tremendous inspiration as a team leader, yet finally he made the decision to go back to the university because he could not basically—now, there are other examples. It is isolated, but nonetheless, it is characteristic of many of the phenomenon.

Mr. NARATH. By the way, I don't have any trouble working with either Los Alamos or Livermore. I don't know why it should be a stretch.

With your indulgence, I would like to recite just a little bit of history. The mission that you describe is, indeed, one that is inspiring. And if this were 1965, it would be clearly all that I would need to run a very effective laboratory. In fact, in 1965, Sandia had some 8,300 people entirely engaged in the nuclear weapons program and its various aspects.

The program began to decline in 1965. We were then a single-purpose laboratory, very sharply focused. We went through the early 1970's, we had several layoffs, we shrank by some 20 percent and it became perfectly obvious that even back then there were insufficient resources available to maintain all of the capabilities at Sandia required to carry out our nuclear weapon mission.

For example, we were unable at that time to fully support all of our enormous spectrum of test facilities, rocket sled track, shake, rattle and roll facilities, all these large, expensive facilities. So we decided on a strategy of diversification, and it didn't come easy. It took a lot of discussion within the government, within AT&T, who then had the management responsibility. But we took some responsible steps toward becoming a multiprogram lab in about 1973.

We have concentrated ever since on taking on those additional mission responsibilities that had a technical common denominator with what continues to this day to be our core mission, and that is support of the U.S. nuclear weapon program. So today we are a multiprogram laboratory.

But if you look inside the lab, you still see a very sharp technical focus. And that focus, the position of that focus is determined by the needs of the nuclear weapon program.

So if there were sufficient resources to cover the needs that you describe, I would have no difficulty, especially if you committed 5-year duration block grants with no questions asked. But you know that is unrealistic as well as I do.

If anything, the program will continue to shrink. We may reach a point in time sometime in the next century, when we still have to carry this very awesome responsibility, but do so in an environment in which the remnants of the nuclear weapon program are then embedded in a larger program. I hope that day doesn't come. But I think we have to prepare to face up to it.

Mr. DELLUMS. Thank you.

Mr. Chairman, before I yield back to you, I would just like to make one observation. I have listened carefully to the responses of our three distinguished witnesses. It seems to me it underscores a point we tried to make over and over in the last 24 years, that budget reflects in a very fundamental way your values. It reflects in a very fundamental way your priorities. And if I hear all three of these gentlemen, they are making a very simple, straightforward comment, and that is that scientific genius and brilliance moves toward what the Nation sees as important, because what the Nation perceives as important is where they put their dollars.

It would seem to me, Mr. Chairman, that if you and I can agree that treaty compliance in a post-cold-war world, where there are literally thousands of nuclear weapons, is a very important thing, and if you and I can agree that in a world where cruise missile technology is expanding exponentially, and other technologies are expanding so that issues of proliferation and counterproliferation are important issues, and we perceive saving the world from a nuclear disaster is important for our children down the road, then we put our money where our mouths are and scientists will move toward that, if I hear what these gentleman are saying.

That if you have to cut the budget—my politics say that I appreciate that we have—then we are not building new nuclear weapons

at this point, and if we decided to shift a substantial amount of money into treaty compliance and nonproliferation, then their scientific problem is significantly altered, because scientists start to gravitate toward those programs because the dollars and the resources are there.

Second, at a time when some of our colleagues are talking about getting rid of technology transfer-type programs, maybe if we hear what these folks are saying, then maybe that is not the direction that we ought to be going in, as a matter of fact, just the reverse.

So I think these hearings are significant, but the implications, you and I may interpret them differently based on our politics, but I just think there are additional significant issues out here that will allow them to handle their personnel problems, but it means defining what we perceive to be important priorities.

I just think the important priority is not how we keep scientists building new nuclear weapons, but how do we figure out how to deal with the danger that is ever-encroaching upon us on a daily basis. That is the challenge of the future.

If I heard them correctly, people are going to move toward that. If you put the money there, if you don't put any damn money there, nobody goes, they shrink, and their personnel goes down. It is a simple, straightforward thing. We have to handle it politically.

Mr. HUNTER. I thank my friend for his comments, and observations.

Let me just observe this, that I think deterrence in nuclear war and the reduction of the nuclear threat is the mission of the labs. And historically, there has been two ways that they have helped this country pursue those goals.

One is through the construction of a nuclear deterrent system, which is peace through strength, a strong strategic triad. And the other is through treaties and through compliance tools with respect to those treaties.

I would be happy to concur with my colleague that both of those elements are important. My friend may disagree with me with respect to the prioritization of those two elements, but I think they are both necessary.

Let me just offer something that on an intellectual basis is a little bit in the back of my mind. It is a little bit of a digression, but has some relevance here. My brother was going to fax me an article by a gentleman who is not considered to be a hard-core, conservative, peace-through-strength type, in one of the national journals which offers an interesting proposition, which is that by being strong in a strategic sense, by continuing testing, by not creating any type of a strategic or nuclear vacuum, that we will deter would-be proliferators more than if we back out of this arena.

It was this writer's—and I want to get this article for you, Ron, because I know you would be interested in reading and commenting on it, but here was someone who isn't necessarily a militarist or a conservative, but who feels that if we back out of the nuclear business in the way that we appear to be headed, that that is going to accelerate all the wanabe's out there who will tend to proliferate more.

So that is keeping a strong nuclear production base, and testing is an important part of deterrence and reduction of the nuclear threat.

That is an interesting idea. It is one that hasn't been circulated in Washington, DC. When I get this article on this issue, I would certainly like you to take a look at it.

But that brings me to a question here, because, Dr. Narath, you have said that your budget for R&D has gone down. But you read the Galvin report, and their first observation is that the existing budget of the national laboratory system exceeds that required to perform its agenda in the areas of national security, energy, environment and fundamental science.

So the Galvin report is saying that the labs have plenty of money if they follow their areas of chatter. Now, you are saying, but our R&D money is dropping like a rock.

Am I missing something here? Is that just something you disagree with? And I would ask the other gentlemen to comment.

Mr. NARATH. Let me take a crack at this, because from time to time, I have gone on record as having made statements very similar to this.

Look; the issue here is that the DOE national laboratories collectively have an annual operating budget in the vicinity of $6 billion. The problem lies in the details, in this case, the distribution of funding. I mean, you could ask whether $6 billion is needed, if you look at DOE's responsibilities in the aggregate, and that covers the spectrum from nuclear weapons, energy, cleanup——

Mr. HUNTER. So you are not necessarily disagreeing with the Galvin report as a generalization?

Mr. NARATH. It is a very dangerous thing to agree with such a statement in today's climate, but I can certainly understand the origin of such a conclusion.

But now if you ask, within that $6 billion, is the nuclear weapon research and development account overfunded or underfunded, I mean, there is no question in my mind what the answer is, and the answer is it is underfunded. I don't even think that Bob Galvin would disagree with that statement. I can't speak for him.

Mr. HUNTER. Can we redirect some of this money and have money to do what we need to do here within the existing budget?

Mr. NARATH. Careful.

Mr. HUNTER. Slap some color into his cheeks.

Mr. TARTER. Dr. Narath has already gone farther out than I might have expected. I actually don't know the specific origin of the comment. I think to some extent, you—I am trying to find my own way out of this path, but going back to your earlier observation about did—they made an observation basically about how efficient the labs were in a variety of different ways. I think—and whether they looked for new missions. I think that was one of the comments you made.

I think they got a sense that every laboratory at the edge had some fuzz associated with it, of things which in fact were not particularly high leverage, not of overwhelming importance to the country, but they didn't put a number on that. So if I had to make my own inference, it is that that number, which is $6 billion for the whole complex, it certainly has some things, which, if you went

through the whole list, would not appear at the top of your priority list.

My own perspective is that you ought to look at the budget by program, not by totality. And each program you can judge on its merits.

I am in overwhelming agreement with Dr. Narath, I think the national security piece is underfunded in both the nonproliferation area, and until this year, in the stockpile stewardship area. I think this year's budget begins to bring those into a reasonable balance, and the other budgets we had pieces of, but I can't comment on the overall——

Mr. HUNTER. There was one criticism, and I want Dr. Hecker to comment on it, by the Galvin Commission, or the essence of one of their statements was that instead of having an integrated focused prioritization of programs by the lab, what you have is a host or conglomeration of individual projects, all of which have patrons like NASA and other entities, and they all tend to try to go out there and do the best job they can to get their piece of funding, but that that overall tends to deprive the process of the focus that you need and the money where you need it the most.

I want to thank the gentleman from California who has gone out the door. He has gone. He hung with us for a long time.

Go ahead.

Mr. TARTER. In a formal way, I would agree with that criticism, but I think one of the things that the 10 laboratory directors did was, in fact, try to make a way to respond to that particular criticism on a number of the programs, but I think Sig actually led much of that response.

You might want to comment on that.

Mr. HECKER. Yes, I would like to take issue with the statement, because the way I look at it, I think the size needs to follow function, that we first need to clearly define what the function of the Department of Energy and the laboratories are within that Department of Energy mission. And, for instance, that statement, in my opinion, does definitely not apply to the issues that we have been discussing so far today, and that is the nuclear weapons, the defense programs efforts.

And the reason is the following: It has been quite clear for a number of years that this big pie, the DP budget used to be $8 billion, it has been shrinking dramatically, and it is going to shrink some more in the out years. However, the way to make sure that you can still get the job done and to make it most cost-effective, Dr. Reis's strategy that he has worked with us is that the laboratories will play a bigger part within a shrinking sphere. And so I really think that it is not that the laboratories are oversized. I actually would invest my money in the laboratories in this integrated R&D manufacturing. We will save the country money doing it that way. And so I disagree with that.

If you look at the whole system, if you include the energy-related functions and environmental-related function, we haven't done the job well enough to define the functions to determine what the size should be.

Mr. HUNTER. Let me go to——

Mr. NARATH. Can I add something to that?

This is a little dangerous to put yourself in the shoes of Mr. Galvin, but I can guess that when he looked at the complex and saw that $6 billion, he looked at it as a businessman would, and he looked at what DOE really has a mandate for in terms of what its missions are, and he just concluded, in sort of a global way, that $6 billion sounds like an awful lot of money, I will bet I could do this for a lot less.

He concluded very quickly, for one thing, that there are inefficiencies in the system that could lead to cost reductions of some significant magnitude. But I think the vision that came out of the Galvin report was compromised, because the membership represented a very broad spectrum of views and backgrounds. The vision that came out of that report is not the vision that I entertain, because I think the fact of the matter is that the DOE national labs, while supporting DOE's core mission responsibilities, have done much more than that over the years.

I mean, they have really been as inefficient, as some may say they have been over the years, they have been a national scientific and technological resource that has impacted our society in many, many different ways. And if you take that larger view, then perhaps $6 billion is not an unreasonable investment. That is now how the committee looked at it.

Mr. HUNTER. Thank you.

I want to move to an area now that Mr. Dellums and I may be able to agree on—with this premise that you have offered that we need to reduce the nuclear threat, as well as expanding it, should be a role of the labs.

If you read the Galvin Commission's report on the environmental cleanup, and you believe what they say, and you read the other reports like the one about train wreck along the river of money that was done for the Senate, it is a nightmare.

According to these reports, even the most conservative reports, we are spending a ton of money, little is being done. Total disconnect between science and application. Tremendous confusion. Little risk assessment that is science-based. Just tremendous problems.

Now, when you read those reports, and all the contractors, the private contractors that are kind of milling around in this, you get to the point where you feel that probably most of the government people involved, the DOE people, and maybe the contractors, too, everybody is just hoping to kind of weather the storm and get to retirement. I mean, this is just a big mess. And I thought of the labs. I thought of the labs and maybe the labs taking some leadership.

Because I think one thing you folks have pointed out is that the labs have creativity, they have got flexibility.

Dr. Narath, your folks came up with a way to have a fence, a humane fence that you would be able to have between the international borders of California and Mexico, to stop the drug drivers. And it is pretty doggone interesting.

We brought it up to Immigration Nationalization Services [INS], and they hadn't even seen it, or maybe you sent it out to them and they expressed it or something. But your people, who have never done anything like that before, came up with some good ideas.

Now, my question is, if we radically changed our approach to cleanup, and we went, for example, to the tank farms, 700 and some tanks at Hanford that are a monster problem, and we said, OK, Sandia, that one is yours, you guys get in there and analyze—hey, more missions already. But you did a risk assessment, in fact, you may have to do a risk assessment on the risk assessment, because the reports I saw said that just doing—in fact, this wasn't the Galvin report, this was the report done for the Senate, the Blush report, they said that there may be massive dangers in assessing—site inspections where you are assessing the risk. So this is a pretty complex and dangerous thing.

But if we gave you the tank farms and said, OK, you have got these smart, talented people, go in and find an answer and bring your technology together and marry up your technology with people who can move the dirt, that is, the contractors, and get this thing done with a minimum of interference from DOE and this tremendous network of laws—we have got such a monster network of laws now that everybody is afraid to do anything, and maybe we can give you a moratorium on those, and you simply say, do what is right, take care of the dangerous stuff and come back and develop some technology that will allow us to do the less dangerous stuff over an extended period of time.

But giving you a goal like that, focusing you on a goal and giving you a real piece of a real problem and setting you on it, and then maybe giving Livermore and giving Los Alamos other pieces of this problem, the most vexing pieces to start out with, and saying, solve them, is that something you folks could do?

Mr. NARATH. I thought you would never ask. I think the answer is yes. But let me expand on that.

I have thought for a long time that there are striking parallels between the cleanup problem and what the nuclear weapons program accomplished. First of all, in terms of science, they are sort of comparable. You are talking about a $6 billion annual investment in cleanup. It is technically very complex. There are all kinds of nontechnical issues.

So the kind of management approach that was so successful, I would think the nuclear weapons program clearly should find a place in the environmental cleanup arena.

What has distinguished the nuclear weapons program, it seems to me, are at least two factors: Very high degree of vertical integration, a lot of it managed within the laboratories in which science and technology and the real application were allowed to interact in real time, all the time; and second, a very high degree of teamwork, not only among the laboratories, but between laboratories and production plants, DOE headquarters, and so on.

So you might say, you know, why can't we apply these same principles? There is one difference. Had the nuclear weapons program faced the kind of regulatory burdens that the cleanup program now face, we may never have had a bomb. In fact, as you are well aware, that is very difficult to take the remnants of bombs today and put them anywhere.

Mr. HUNTER. I saw one figure that said 75 percent of the Superfund money has gone to lawyers in this area.

Mr. NARATH. I can believe that. So what I am saying is that Mr. Grumbly at DOE is facing a horrendous challenge, and it is not all technical.

Mr. HUNTER. Well, this is a question to you and to Dr. Tarter and Dr. Hecker. I understand that. I mean—and basically everybody has been paralyzed because you have got this morass of legal decisions, lawsuits, you will go to jail if you don't move out tomorrow, so people go into a make-work program and accomplish little, all the problems that come about.

Probably the only way we are going to be able to effectively fix this is put it, first, in the hands of an expert, a real expert, and you folks are the best experts we have got. And second, give a moratorium to you on all these laws, so that the day that you say, wait a minute, we are going to sit back and we are going to start on this first, you don't have the State of Washington rushing in saying, Dr. Narath, you are off to jail because we are going to get a court order that sends you to the hoosegow, because you didn't start on plan number 19 and you didn't complete it by X date.

So we are probably going to have to come up with some type of a moratorium. And the only way the Congress would agree to a moratorium on all these laws we have enacted, this labyrinth of laws, State, local and Federal, is that we are confident that the problem is placed in the hands of an expert who can do something about it. And you folks are the best experts we have.

So with that condition that if we gave you a moratorium on the regulations and said, don't worry about the regulation, just do the job and take the most dangerous stuff first and come up with a cost-effective way to clean it up, handle at the same time things like tank farms that are similarly an ongoing problem, tell us how we are going to monitor this thing, could you do it?

I want to let Dr. Tarter and Dr. Hecker have a chance to answer that, too.

But could you do that?

Mr. NARATH. Well, the simple answer is yes, but there are a lot of provisos. One is you would have to give us the ability to decide on future land use. When you talk about cleanup, you know, how clean is clean? I can't imagine that the tank farm at Hanford will ever be cleaned up to the point where it is back to its virgin state. I don't think that is economically or technically——

Mr. HUNTER. We would ask you to be creative and to come up with your commonsense ideas about what is plausible, what is doable.

Mr. NARATH. The last thing I will say is that you would have to guarantee that you will stay in position long enough so that we can carry out the task or at least take us to retirement.

Mr. HUNTER. We are voting on term limits shortly.

Dr. Tarter.

Mr. TARTER. Let's see. I would like to pick up on one comment which Dr. Narath made, and I think the essence is that what worked in the nuclear weapons program was having an integrated team with a great deal of responsibility left to the laboratories to decide how to do it. And I think in this area, taking regulations aside and using some sort of risk-based prioritization, I think you will need to invoke more than any given laboratory, because there

are different skills among the different laboratories, just because of the sites they have been at, and we are good at cleaning up different pieces of different ideas.

To use an old cliche, there are more smart people in the world than just within the laboratories. So I think if we did this job right, we would involve industry, we would involve universities, but we would not start with bureaucrats. That is the basic problem with the system right now, that there is an interface between bureaucrats and lawyers, and, obviously, the pyramid of workers is at the bottom. I think that is one of the things which the laboratories could act as a focal point and catalyst for, but I think it takes more than this lab doing this job and that lab doing that job. It takes a perspective towards that problem.

Mr. HUNTER. Here is what I would kind of envision, is the idea that, for example, the tank farm, Sandia might be the lead, so they would interact with the other laboratories, so there would be a flow of technology capability, maybe even people in certain areas, and you would also have—you would round up first the inventory of technology of the companies that had been working on this thing and expending, what, at Hanford $7.5 billion, according to these reports, with no indication of hardly any action.

So you round up your technology, both from your sister labs and industry, and you would be the leader in that case, and you would have to work effectively with industry.

Dr. Tarter, maybe your laboratory would be a leader in another segment of this cleanup, this the same way you have done with weapons programs. So we would assign these things out so that each lab would have some order of peer review, if you would, where you could always come in as you have done, and Dr. Hecker could say—his people could come and say, we have a little constructive criticism of what Sandia is doing here, you could do it a little better by doing this.

Now, is that reasonable?

Mr. HECKER. Yes, it is.

Would also like to go back to your original question, to also answer in the affirmative, that I think that is a reasonable approach. Actually, there are a couple of places where we have pushed the Department of Energy to do just that. Actually, we said to them, give us a tank at Hanford, we will do it. We played a very large role in remediating the most hazardous tank at Hanford. And our nuclear testing folks, actually our theorists and computational folks all helped to make that happen.

We have gone to Mr. Grumbly on the other really high-priority issue in the complex, and that is Rocky Flats. And as you well know, the Rocky Flats facility was shut down in June of 1989. The plutonium is just sitting there in columns and tanks, in the ducts. That needs remediation.

Yet, most of the thinking at Rocky Flats was still guided by the agreements with the State and the EPA of 5 years ago, where they are worried about environmental cleanup.

So we have said precisely what you just said. We will go in and we will do the plutonium residue work at Rocky Flats. We will lead the technological effort, we will pull together a team, other plutonium experts from Livermore and whatever is available in the com-

mercial world to do precisely what you said. But you also hit the nail on the head, it is not so much a moratorium, but really just relooking at the responsibilities and the liabilities associated—but yes, our laboratories are prepared to do precisely what you said.

Mr. DELLUMS. Mr. Chairman, just one additional question that I think would round out the record on this matter. As you three gentlemen are aware, there are proposals out there that either do away with the Department of Energy and take the three of your labs and place those three labs in the Department of Defense, as a maximum proposition, or as a minimum proposition, to simply take the three labs that are presently under DOE out from under that Department and put them directly in the Department of Defense.

I would like to ask the three of you to respond to those proposals. How do you think you would fare and what are your concerns about that proposal, positive or negative?

Mr. HECKER. On——

Mr. DELLUMS. Is that a fair question to ask you?

Mr. HECKER. Oh, sure, absolutely. It is one we think about daily as we get the news reports from what is happening in Congress and Washington. Clearly, our future is at stake, and we think about it.

In terms of the move to the Department of Defense, it is one that I am strongly opposed to. All the things that have been said here this afternoon about the importance of the civilian programs, the multipurpose nature of the laboratories, I thought Mr. Curtis hit it on the head several times this morning, right on, in terms of the importance of the independence.

You were talking about this morning, the independence and the question of, would we test if we are had to. In the current set up, where I work for the University of California, in the Department of Energy, I will tell the Pentagon and the President that we may have to test to keep a system in the stockpile. I have that independence in the current set of governance that is there. I think that is extremely important.

So I do not think that having the laboratories go to the Department of Defense is in the best interests of the country. If there is going to be a Department of Energy, I think it can be a good home for the laboratories. And so I prefer to fix the system. If not, then I certainly want to make sure that we would be able to maintain this multipurpose, both defense and civilian leveraged and the academic aspect, research aspect, because that is how we can serve the Nation the best, in whatever sort of agency or department that can fit. I think it is possible to preserve the science so that we can do the best job for the country.

Mr. DELLUMS. Thank you, sir.

Mr. TARTER. I think we are probably all in agreement on the yes or no part of the answer. I think it is a very bad idea to move the laboratories into the Department of Defense. I think there is a reason of principle and one of practice. The one of principle is one that Sig has already indicated. I think the independence of viewpoints of any perspective comes from the present system. And I think on something as central as nuclear weapons, I think that is a very crucial thing to have.

The matter of practice has two aspects: One has been allude to. In the case of all three laboratories, some significant fraction of our budget comes from civilian programs. I think the lifetime of that support will be very short if we are part of a very focused agency.

Second, I will simply report without personal knowledge, but when Dr. Deutch provided testimony in one of the early sessions of the Galvin Commission, the task force, I think he made a comment very similar, because he opposed it very strongly. I think he opposed it both on the grounds of principle and also he recognized without picking a cause that the quality of work at these laboratories, in his observation, I don't know what the verbatim is, seemed much higher than that at a typical laboratory within the Department of Defense with a much narrower mission.

So I think both on the issues of principle and practice, you get a much better product.

DOE is not perfect. I hope the reforms work. But I don't know a better system right now.

Mr. DELLUMS. Thank you, sir.

Mr. NARATH. I agree with everything that has been said.

First, it is very important that we maintain the multipurpose, multiprogram status of the laboratories for reasons that, you know, have been repeated often today. It is frequently argued that the reason why we need to maintain the separation between DOD and the nuclear weapons program is somehow related to conflict between civilian and military management or leadership. Of course, it is pointed out that for a long time, the Department of Defense has been under civilian leadership.

I don't think that is the issue at all. I think the issue is that the job of the DOD has to do with fighting wars, preparing for and fighting wars, as needed. So you have a department of warriors. Nuclear weapons, I think, require some distance from that.

These weapons have awesome power, with awesome consequences. It is very paradoxical. They are weapons, they are more important than any weapon that has ever been invented by man, played a more important role in keeping peace, preventing major global war, than any other weapon.

It is also the least-useful weapon that has ever been invented. Basically my concern is that within the Department of Defense, there would quickly develop an indifference, a lack of interest and a lack of attention that I don't think would be very good for the program.

You have in the three laboratories today really the conscience of the nuclear weapons program. We may not be perfect. Many times, we may be self-serving in what we do. But fundamentally, what has attracted people into the program, right down to the roots, is a strong conviction that this is important for the country and that this is a job that is worth doing well.

I doubt very much, and I don't want to be critical of the Department of Defense, what they are responsible for doing, they do very well. Somehow that doesn't mix with the kind of stewardship responsibility that you have placed in our laps.

John Deutch, Secretary of Defense, Harold Smith, they all agree with that position. So I think this independent judgment, I think, just fundamentally, these things don't mix. Right now, if you look

at the spectrum of technical activities associated with the Department of Energy missions, it covers beautifully all the technical responsibilities that have to be covered in exercising the nuclear weapons program responsibilities. So it really is a very good match from a scientific and technological standpoint.

Until you gentlemen and ladies invent a better home, I cast my lot with the Department of Energy, and I think we should all push very hard to institute the necessary improvements to bring this Department into the next century in the kind of shape that it needs to be to protect this program and carry it forward.

Mr. DELLUMS. Mr. Chairman, I would like to thank all three of our distinguished witnesses for their answer to my question.

Before I yield back to you, I apologize to you and our witnesses for being a few minutes late. The meeting that I alluded to earlier went on just a little longer than anticipated. But as you know, I try to be here and sit with you throughout the hearing, and I just apologize for being a few minutes late.

Mr. HUNTER. Let me just say to my friend, as the distinguished ranking member of the full committee, it is a privilege to have you sitting in on our subcommittee hearings, and we appreciate it, and I think we have had some good discussion here, and maybe have come up with some things that we can do better.

We have had, Mr. Dellums and I have had our shot at you, we have asked some toughies. Is there anything, I would like to give each of you a chance, if there is anything you have left out or any theme you would like to leave us with here, this is your chance to make a little closing statement, if you want to.

Dr. Tarter, if you want to—is there anything in particular, any message that you would like to give us from Livermore?

Mr. TARTER. I think the common theme that I alluded to earlier, which many of the groups that have looked at the laboratories agreed upon, and I think you heard it from each—from both Dr. Narath and Dr. Hecker, is the strong focus on the people at the laboratories, and I think the most important thing in creating those outstanding people in the future is—I will restate it again—is a sense of bipartisan commitment to the long-term focus in both the stewardship program and the nonproliferation program.

For Livermore in particular, that is a very important thing for people to understand. We can sort through the details of individual responsibilities, but I think a sense that we are involved in those programs and that we are valued is a very important thing in my laboratory.

Mr. HUNTER. Thank you, Dr. Tarter.

Dr. Narath.

Mr. NARATH. I think I have already presented my views as well as I can. There is only one area that I wish we had had more time to discuss, something that I think is extremely important, and that is the role played by our collaborations with universities and industry. I mean, I understand the concerns that some of you have expressed as to the relevance of those interactions to our core missions. I would like to assure you that this is something we think about constantly.

In the early days of this competitiveness drive that we all got involved in, we may have interacted with industries that were not

particularly relevant. What matters is not so much what the product or the industry is that we interact with; what is important is to what extent we share common scientific and technological needs and interests.

And I can tell you stories about industries we have interacted with, where the interaction has led to technological advances of direct use to the weapon program that you never would have guessed, had you known what the industry is.

So this is the subject that, perhaps, on some future occasion we can return to. I think it is extremely important for the maintenance and vitality of the laboratory. And ultimately, our ability to execute the job that you have assigned us.

Mr. HUNTER. Thank you.

Dr. Hecker.

Mr. HECKER. Thank you very much for the opportunity to have the last word. I would like to return to the issue that is first and foremost on my mind today, and that is the people issue. And how do I keep my very good people in the nuclear weapons program. And there is no question our people like to do good science. But, you know, they can do good science someplace else.

They come to Los Alamos because of the combination of being able to do good science and doing something really important for the Nation. That is what is attracted them for over 50 years for those purposes. And so that gets back to the budget issue.

Mr. Dellums, you were absolutely right, the budget does in the end reflect what the country thinks is important. And so the 1996 budget is crucial for us, since it has been downhill steadily, we have got to show that we are going to arrest, and in fact, and it wasn't discussed this morning, this grand vision and plan that we have for the next 10 to 15 years, I see the defense program budget having to go up in 1997 and 1998, so that it can go down in the year 2005 and out, because we will have to invest in the capabilities and facilities and the laboratories for those laboratories to do a larger portion of an overall smaller job.

So I really ask for your support, because in the end our people will be watching those budget numbers, and right now it is crucial to keep those people in the nuclear weapons program.

I thank you for the opportunity to be able to share all those thoughts with you today.

Mr. HUNTER. Thank you, Dr. Hecker, and gentlemen, thanks for bearing with us here and spending some time with us.

Let me just go to one thing that is important, to Dr. Hecker, and since this is kind of a discussion, Dr. Tarter mentioned that one of their most outstanding people left the lab because of overregulation, I guess some areas where he was trying to be creative.

Mr. TARTER. It was a factor.

Mr. HUNTER. That became a problem. And, of course, all of us have experience in our own offices and in business where when you empower an individual to go out and take the ball and run with it; that invigorates that person, and you get a lot out of them, and if you regulate the devil out of them, you tend many times to demoralize them.

So I think there is a direct relationship, you have gone back to people as one of your primary interests, there is a need to empower

these people, our creative people in the labs. Now, the Galvin report, and a lot of this has got to be laid at the feet of Congress, for our tendency to micromanage, but inordinate internal focus at every level of the labs on compliance issues and questions of management processes—now, there is nothing that demoralizes the troops more than having to report every 5 minutes to headquarters, or fill out another report.

One of my Navy friends once wrote me from the coast off Korea and said, I would like a little time to sail the ship. All I am doing is sending reports back to the Pentagon. So that happens throughout the array of government institutions.

So what I would like to get from each of you is your budget—your budget is important to you—the percentage of your budget that goes to management last year, and the percentage of your budget that went to management in 1985. And get kind of a picture on that, so that tells us, if you can free up some of that money that is being spent by managers, if you will—and I think you guys are right when you say that part of that—perhaps that management buffer has been built to try to handle DOE with all of its requirements and micromanaging, but if we can take some of those resources and move those to creative people, we will have done the country a service.

If we are do involve you folks, I think we should involve you as leaders in this cleanup, at specific sites where you take on challenges and you get them done, and when the lab walks away from that site, that site—and I think you need to be involved in the level of saying, listen, as our resident doctors here, that is why I like to have two opinions, that is why we want to have at least a couple of labs.

But to be able to say, listen, you guys are going to spend the entire budget of the United States trying to turn this particular piece of ground into pristine condition. You can't turn it back to this condition, to condition B for X dollars. We have got some new technologies to tell us how we can do that, but you should be involved this those decisions also.

If you moved into this area of working the cleanup as a leader, not as just another part of the chain where the bureaucracy remains massive and intact, and you folks are at the bottom, but if you moved into that, I think you would be able to exercise with industry very vigorously, and you would acquire some—that would be good in that sense.

So I am sorry your closing statement was a good provocative statement, Dr. Hecker, and I congratulate you for it in that area. So having said that, is there anything else that you would like to add, Dr. Hecker, in your final words?

Mr. HECKER. In answering your specific question?

Mr. HUNTER. Well, no, you don't have to answer that, but—I am sorry, I took off on it, and I just wanted to know if you have any final thoughts.

Mr. HECKER. No, you have given me every opportunity.

Thank you.

Mr. HUNTER. Well, gentlemen, thank you.

You and your institutions and your personnel are a very critical part of America's security and our well-being, and we thank you for

your dedication to this country and for spending so much time with us today. We appreciate you.

[Whereupon, at 4:10 p.m., the subcommittee was recessed.]

[The following questions and prepared statement were submitted for the record:]

UNITED STATES HOUSE OF REPRESENTATIVES

104th Congress

First Session

NATIONAL SECURITY COMMITTEE
Subcommittee on Military Procurement

Statement for the Record

Inertial Confinement Fusion at the University of Rochester

submitted by

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March 1995

Summary and Requested Action

The Department of Energy's (DOE) Defense Programs' Strategic Plan relies on maintaining the technology infrastructure and core competencies to insure that the U. S. nuclear deterrent is credible while contributing to the U. S. research base. The National Inertial Confinement Fusion (ICF) program plays a central role in the stockpile stewardship technology program with the threefold laboratory mission: (1) To demonstrate the ignition of small masses of thermonuclear fuel, (2) To provide access to physics regimes of interest in nuclear weapon design and to provide nuclear-weapons-related physics data, and (3) To provide an above-ground simulation capability for nuclear weapons studies and effects. With cessation of underground nuclear tests and contraction of the nuclear weapons research and development effort, ICF is a vital component of the DOE's technology-based stockpile stewardship program. A potential long-term spin-off benefit from the program is that ICF could provide a source of environmentally acceptable and economically competitive civilian power.

The University of Rochester's Laboratory for Laser Energetics (LLE), a participant in ICF research since the 1970s, is the only ICF program that has been jointly supported by the Federal government, State government, industry, utilities, and a university. At relatively small comparative cost to the government, LLE makes contributions to the National program and transfers technology to the public and private sectors through the training of graduate students and interactions with industry and other Federal laboratories. The facility serves as a National laser users' facility benefiting scientists throughout the country.

The Laboratory's prime mission is to validate the direct-drive option for ICF. There is a close collaboration among LLE, Lawrence Livermore National Laboratory (LLNL), and Los Alamos National Laboratory (LANL) to support the demonstration of ignition and gain in the laboratory, the objective set by the National Academy of Sciences' (NAS) review of the National program in 1990.

Reviews of the Rochester program by the NAS and the Inertial Confinement Fusion Advisory Committee (ICFAC) recommended the OMEGA Upgrade and the potential of direct drive as high priorities in the National program. This year, the OMEGA Upgrade, designated a major project by DOE, will be completed and be placed into operation after a four-and-one-half-year construction period. The OMEGA Upgrade will be the only facility that can demonstrate the scientific potential of direct drive to provide a modest- to high-gain energy option for the Nation. The Upgrade is being completed on schedule and within the $61,000,000 total estimated cost (TEC) schedule approved by DOE. The DOE-approved funding profile in the Cooperative Agreement for the LLE program, for operation of the new facility is shown in the table below.

	FY93	FY94	FY95	*FY96*	FY97
Operations	$15,590,000	$16,498,180	$17,165,770	***$18,191,770***	$19,150,770
Capital	$23,410,000	$8,700,000	$3,600,000	***$1,900,000***	$2,000,000
Total	$39,000,000	$25,198,180	$20,765,770	***$20,091,770***	$21,150,770

To provide the operations support for program deliverables and operation of the OMEGA Upgrade, and maintain the training programs at Rochester, a total authorization and appropriation, as included in the Administration's budget for FY96, of $20,091,770 ($18,191,770 for operations, and $1,900,000 for capital equipment) is requested for the University of Rochester for FY96.

Background

Thermonuclear fusion is the process by which nuclei of low atomic weights, such as hydrogen, combine to form higher atomic weight nuclei such as helium. In this process some of the mass of the original nuclei is lost and transformed to energy in the form of high-energy particles. Energy from fusion reactions is the most basic form of energy in the universe; our sun and all other stars produce energy by thermonuclear fusion reactions occurring in their interior. Fusion is also the process that provides the vast destructive power of thermonuclear weapons.

To initiate fusion reactions, the fuel must be heated to tens of millions of degrees. In stellar bodies, containment is possible because of the large gravitational force. On earth, two different paths are being investigated to demonstrate controlled fusion: magnetic confinement fusion and ICF. ICF involves the heating and compression of fusion fuel by the action of intense laser or particle beam drivers. There are two approaches to ICF, direct and indirect drive: indirect drive involves the conversion of beam energy to x rays to compress a fuel capsule in an enclosure called a hohlraum; direct drive involves the direct irradiation of a spherical fuel capsule by energy from a laser and may be more efficient energetically than indirect drive. For either approach, if very extreme density and temperature conditions are produced, it is possible to produce many times more energy in these fusion reactions than the energy provided by the drivers.

Inertial Confinement Fusion Program Focus

The 1990 NAS review of the ICF program[1] identified the program priorities that were subsequently endorsed and are being pursued by the DOE. The NAS report states *"The expeditious demonstration of ignition and gain should be the highest priority of the inertial confinement fusion (ICF) program. Adequate funding toward this goal must be assured."*

To implement this recommendation, the NAS report identifies the glass laser program as the best path for demonstrating ignition (initiation of a thermonuclear reaction that can be self-sustaining) and propagating thermonuclear burn. The three high-priority tasks identified by the NAS to accomplish the program goals are: (1) To conduct precision indirect-drive experiments on the NOVA laser at LLNL, (2) To validate the laser architecture required for a National Ignition Facility (NIF) using the beamlet at LLNL, and (3) To construct the OMEGA Upgrade at the University of Rochester's LLE for precision direct-drive experiments.

DOE accepted the NAS recommendations, and substantial progress has been made on all three tasks. Encouraging results from indirectly driven targets from the NOVA facility at LLNL have been obtained. Based on these data ICFAC recommended, and DOE approved, proceeding with the conceptual design phase (DOE's Key Decision 1 or KD1) for a major facility, the National Ignition Facility (NIF). The purpose of the NIF is to demonstrate ignition, propagating burn, and modest gain in the laboratory. The NIF could begin activation in the year 2000, with KD4 (Project Complete) scheduled for the end of FY02.

LLE is the primary focus in the U. S. for the direct-drive approach to ICF. The NAS report states that direct drive may ultimately prove to be the best approach to ICF and provide the most efficient path to a laboratory-scale thermonuclear capability for both energy research and defense technology needs. OMEGA is the only facility that can demonstrate the scientific potential of direct

drive to provide modest- to high-gain on the NIF. The decision on whether to implement a direct-drive capability on the NIF will be based on experiments using the OMEGA Upgrade through FY99.

For several years an extensive collaborative program between LLNL, LANL, and LLE has provided data on basic physics, beam smoothing, and unstable hydrodynamics using available laser facilities, such as NOVA. This collaboration will continue on the OMEGA Upgrade. The joint effort includes both nuclear weapons physics experiments and ICF experiments. This effort is a key element in the stockpile stewardship technology program. Physics issues for both ICF and weapons issues for the stockpile stewardship program that will be examined with the OMEGA facility fall into five broad categories: irradiation uniformity, laser energy coupling and transport, laser-plasma interaction physics, hydrodynamic stability, and hot-spot and main-fuel-layer physics. The OMEGA Upgrade and NIF programs are complementary. Figure 1 illustrates the schedule for the glass laser facilities to be used in the National program plan for inertial fusion.

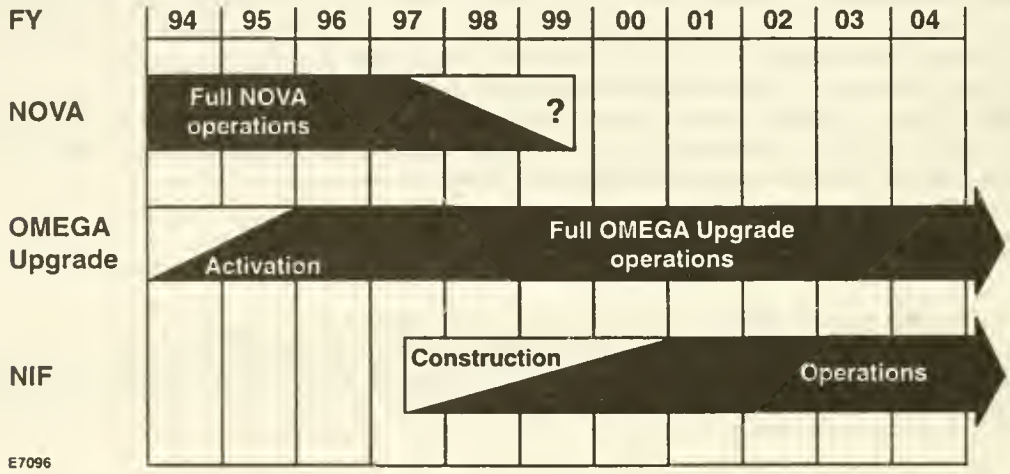

Fig. 1 Anticipated schedule for the operation of NOVA, the OMEGA Upgrade, and the NIF.

The figure illustrates how the National program has been structured to provide a full complement of mature experimental facilities from the present into the next millennium. If the NIF adheres to DOE's present schedule, construction of NIF will result in the eventual shut down of the NOVA laser, with OMEGA as the principal facility to continue experimental work during the final phases of NIF construction. Although the LLE program is focused on direct drive, OMEGA is capable of indirect drive (hohlraum) experiments as well. Both LANL and LLNL presently plan to use the indirect drive capabilities of OMEGA in the future.

The LLE Program for FY96

The OMEGA Upgrade system will deliver 30,000 Joules of temporally shaped, ultraviolet (351 nm) light to direct-drive targets. This will be the highest energy ever delivered directly to a fusion capsule in a laser-fusion experiment. By comparison, for example, the NOVA capsules are driven with up to 3,000 Joules of energy (*$^1/_{10}$th as much as direct drive with the OMEGA facility).* The larger energy will yield critical data for ignition-size capsules. At least 1,000 high-quality target shots per year are scheduled on the OMEGA Upgrade when operated on a single-shift basis. Both LANL and LLNL will collaborate with LLE on many of these experiments. Some of the shots will be devoted to weapons physics issues identified by LANL during FY95.

The goal of the glass laser direct-drive target physics program is to evaluate the performance of capsules near ignition conditions. In addition to providing data for the NIF, experiments can validate a direct-drive option for NIF that could result in two to three times higher fusion gains (gain > 50) than those available with the baseline (indirect-drive) NIF design. The diagnostic instruments for key experiments to be conducted in FY96 are currently being installed on the OMEGA target chamber.

An important element of the direct-drive program on the OMEGA Upgrade is to demonstrate beam smoothing techniques that ultimately will produce on-target irradiation uniformity of 1% to 2%. The first phase of the LLE-developed smoothing by spectral dispersion (SSD) approach will be implemented on the OMEGA Upgrade in late FY95 in preparation for precision direct-drive experiments to be conducted in FY96. This LLE technique has been implemented on NOVA, and variants of the approach are being incorporated in the NIF design to meet the irradiation uniformity requirements of both direct- and indirect- drive targets.

The development of cryogenic fueling is necessary for the post-NOVA-technical-contract ignition optimization experiments as well as for the hydrodynamically equivalent target experiments to be conducted on the OMEGA Upgrade. In collaboration with LLNL and General Atomics, a prototype cryogenic capability to be completed in FY98 is being developed for the OMEGA Upgrade. Cryogenic capability, advanced diagnostics development, and beam smoothing are all required for the NIF. The OMEGA Upgrade will be the principal National facility to develop these technologies for the program.

LLE attaches a high priority to providing education and training in the field of ICF and related areas. These include theoretical and experimental plasma physics, laser-matter interaction physics, high-energy-density physics, x-ray and atomic physics, ultrafast optoelectronics, high-power laser development and applications, nonlinear optics, optical materials, and optical fabrication technology. A total of 60 graduate students and 22 faculty members of the University of Rochester are currently involved in the unique research environment provided at LLE and represent many departments within the University, including Mechanical Engineering, the Institute of Optics, Physics and Astronomy, Electrical Engineering, and Chemical Engineering. More than 45 undergraduate students receive research experience annually at LLE. A high-school summer science program exposes ten talented students each year to the research environment and encourages them to consider careers in science and engineering. Many LLE graduates have made important scientific contributions in National laboratories, universities, and industrial research centers.

References

1 Review of the Department of Energy's Inertial Confinement Fusion Program Final Report (National Academy Press, Washington DC, 1990).

The following questions were sent to and answered by:

The Department of Energy

Charles B. Curtis
Under Secretary of Energy

Kenneth E. Baker
Acting Director
Office of Nonproliferation and National Security

Victor Reis
Assistant Secretary
Office of Defense Programs

QUESTIONS FROM MR. HUNTER

Question: What is the status of the joint U.S.-Russian study of fissile material disposition? What is Russia's preferred method of disposing of these dangerous materials?

Answer: The U.S. has met twice with the Russians on the joint study of plutonium disposition. At the most recent meeting, January 23 through 25 in Los Alamos, the overall organization and approach was agreed upon. The U.S. side has designated individuals and laboratories to co-chair each of the eight technical areas and we are awaiting the Russian side to designate their individuals and institutes. As soon as they are designated the study will proceed on a laboratory-to-laboratory basis. In the meantime, the outline, criteria and outline economic model are being drafted.

In technical papers, senior Russians have indicated that the Russian preference is to use plutonium in reactors, specifically fast breeder reactors.

Question: What are the technical options for storing and disposing [of] surplus fissile materials, and the estimated costs associated with each option?

Answer: In addition to the no-action alternative (continue to store in existing facilities), the following alternatives being evaluated include:

Surplus Plutonium Disposition

- Deep borehole with immobilization
- Deep borehole direct emplacement
- Borosilicate glass immobilization
- Ceramic immobilization
- Electrometallurgical treatment
- Borosilicate glass oxidation/dissolution
- Eurotom mixed oxide fuel fabrication and consumption
- Existing U.S. light water reactors
- Partially completed U.S. light water reactors
- New evolutionary/advanced light water reactors
- Canadian heavy water reactors

Surplus Highly Enriched Uranium (HEU) Disposition

- "Direct" sale or transfer of HEU
- ~~Blend HEU down to low enriched uranium and sell LEU for reactor fuel~~
- Blend down and dispose

Long-Term Storage (HEU and Plutonium)

- Upgrade interim storage facilities and partially consolidate
- Consolidate in a new facility

Several of these alternatives have sub-options or sub-alternatives. The estimated costs of each alternative are being developed and will be available for the Department's decisions, scheduled for early 1996 for surplus HEU disposition and late summer 1996 for surplus plutonium disposition and long-term storage (HEU and plutonium).

Question: What is the status of the Programmatic Environmental Impact Statement (PEIS) on fissile materials disposition? When will this process be completed?

Answer: On March 30, 1995, the Department issued an Implementation Plan identifying the scope of the PEIS on Long-Term Storage and Disposition of Weapons-Usable Fissile Materials. A draft of the PEIS is scheduled to be completed in December of this year and will be provided to the public at that time for review and comment. Public meetings on the draft document are scheduled for early 1996. A final PEIS is scheduled to be completed in the summer of 1996. A Record of Decision would then follow.

Question: Does the Administration oppose using reactors to dispose of fissile materials?

Answer: The Department is in the process of evaluating a range of technical options for plutonium disposition under the Programmatic Environmental Impact Statement for the long-term storage and disposition of weapons-usable fissile materials. Accordingly, no decisions or specific technologies to be deployed have been made.

For plutonium disposition, five of the eleven reasonable alternatives being evaluated use reactors for disposition. In addition, the alternatives for disposition of surplus highly enriched uranium include blending down to low enriched uranium for sale to be used as fuel in reactors.

QUESTION FROM REPRESENTATIVE SKELTON

Skilled Technical Personal

Question [redacted]: A key concern for the long-term maintenance of the nuclear arsenal is the retention and attraction of skilled personnel.

What steps should we take to make sure we have this talent on hand for the future?

Answer: The key to attracting and retaining an expert staff is continuance of a technically vital and intellectually challenging nuclear weapons stewardship program. Through the Science-Based Stockpile Stewardship Program we are creating new programs and initiatives in Defense Programs that can attract the weapons scientists and engineers of the future by offering relevant, challenging work. The proposed National Ignition Facility and the Dual Axis Radiographic Hydrodynamic Test facility would provide the platforms from which interesting and exciting weapons physics research can be performed. The Advanced Design and Production Technology initiative will provide challenging work in weapons related engineering, materials science, and manufacturing science. The Advanced Strategic Computing Initiative will provide state-of-the-art computational facilities. Through these Science-Based Stockpile Stewardship programs, the weapons scientists and engineers of the future can hone their skills on relevant weapons related work. Funding is also an important aspect of retaining our technical competency. Without stable funding and a stable employment future for Defense Programs contractors, young scientists and engineers will not be attracted to weapons related work and those scientists and engineers currently working on weapons development will not be retained.

Skilled Technical Personal

Question [redacted]: Is there any non-weapons Research and Development (R&D) that utilizes the same -- or similar -- scientific skills required for weapons R&D? In your opinion, how

important is it to allow our weapons scientists to work on these types of projects? Please discuss in terms of retaining and attracting critical personnel.

Answer: Yes. Nuclear weapons technology incorporates perhaps the richest and broadest group of physical processes that occur in a single system. The skills required in addressing these varied and complex phenomena include skills that are also applied to non-weapons R&D. A few examples are computational simulations of complex systems, electronics, high performance computing operating systems, the neutronics problems of oil well logging, super-plastic metal forming, high explosive shaped-charge development for non-nuclear munitions, industrial metal cutting, industrial demolition, and general research in astrophysics. Such research can have a synergistic and positive effect by challenging and advancing the capabilities of DOE's nuclear weapons experts.

It is critically important to scientists and engineers at the three weapons laboratories and to the Stockpile Stewardship Program to maintain an active connection to the civilian scientific, engineering, and academic communities through nonweapons R&D to keep abreast of relevant technological and scientific advances and to integrate commercial technology and supply bases into direct weapon activities. Involvement in nonweapons R&D also allows retention and attraction of a broader pool of talent than otherwise would be the case.

QUESTION FROM THE SUBCOMMITTEE ON MILITARY PROCUREMENT, HOUSE COMMITTEE ON NATIONAL SECURITY

Health and Status of the U.S. Nuclear Stockpile

Question: Do you agree that there has been a significant erosion in the U.S. nuclear infrastructure over the past few years? How long will this erosion continue?

Answer: Since the end of the Cold War, the U.S. nuclear infrastructure has been downsized to reflect the realities of reduced nuclear weapon stockpile requirements and the cessation of underground nuclear weapons testing. This redirection of priorities has allowed us to focus on other national security areas including--stewardship of the U.S. nuclear weapons, technology infrastructure and core competencies and the restructuring of the national security enterprise. The maintenance of a safe and

reliable U.S. nuclear deterrent in the absence of underground nuclear testing continues to be a cornerstone of U.S. national security policy and is the basis for our stockpile stewardship and stockpile management program. The Department will continue to provide the nuclear weapons technologies, facilities and expertise required to assure that the stockpile is safe, secure, and reliable. It is the Department's vision to restructure the weapons complex to a smaller, more efficient and flexible infrastructure that will retain the capability and capacity to respond to future DOD nuclear weapons requirements. This future vision of the complex is being addressed in two Programmatic Environmental Impact Statements (PEIS): A Tritium Supply and Recycling PEIS (draft completed March 1, 1995 and Record of Decision to be completed in December 1995) and a Stockpile Stewardship and Management PEIS (draft to be completed February 1996 and final in August 1996). The Tritium Supply and Recycling PEIS evaluates the environmental impacts associated with four technologies at five sites for a new tritium supply facility. The Stockpile Stewardship and Stockpile Management PEIS process will establish the baseline for the future weapons complex.

Health and Status of the U.S. Nuclear Stockpile

Question [redacted] Can DOE guarantee confidence in the safety , reliability, and performance of nuclear weapons over a period of decades without nuclear testing?

Answer: In the coming years we have confidence that with the elements of the Stockpile Stewardship and Stockpile Management program we will be able to ensure the safety, security, and reliability of the stockpile. The DOE Stockpile Stewardship and Stockpile Management program includes an enhanced stockpile surveillance program to identify at the earliest opportunity any potential changes that could affect the safety and reliability of the stockpile and identifies a number of technologies and facilities that will be required in the absence of underground nuclear testing. These include developing advanced computing capabilities, developing or upgrading various nonnuclear experimental facilities, and conducting treaty compliant physics experiments. The Stockpile Stewardship and Stockpile

Management program is not dependent upon any one experimental or diagnostic technique, but rather upon the insight gained from multiple, mutually supporting, lines of research including data from the previous tests. In addition, the President has directed the Department, as part of the Stockpile Stewardship and Stockpile Management program, to maintain the capability to resume nuclear testing, if required.

DOE's "Science-Based" Stockpile Stewardship Program

Question [redacted]: Is there a risk that future weapons designers might have false confidence in their abilities, unproven by nuclear tests, that could lead them to make changes to nuclear weapons that would make them less reliable? Is there a risk that DOE's focus on science per se will weaken the focus on performance, and that building a massive science edifice will instill a false sense of confidence that a more conservative military approach would not accept?

Answer: DOE has begun to implement a Science-Based Stockpile Stewardship (SBSS) program to advance the understanding of the physics, chemistry, and material issues that could affect the safety, reliability, and performance of nuclear weapons. In addition, DOE has also begun implementation of a Stockpile Management Program that focuses on production, routine surveillance and servicing, assembly and dismantlement, and disposal of weapons-related parts and materials. In the coming years we have confidence that with the full implementation of both the Stockpile Stewardship and Stockpile Management programs we will be able to ensure the safety, security, and reliability of the stockpile.

The DOE Stockpile Stewardship and Management program include an enhanced stockpile surveillance program that will identify, at the earliest opportunity, any potential changes that could affect the safety and reliability of the stockpile and a number of technologies and facilities that will be required in the absence of underground nuclear testing. These include developing advanced computing capabilities, developing or upgrading various nonnuclear experimental facilities, and conducting treaty compliant physics experiments. The Stockpile Stewardship and Management program is not dependent upon any one experimental or diagnostic technique, but rather upon the insight gained from multiple, mutually

supporting, lines of research including data from the previous underground tests. The program will also rely upon new manufacturing capabilities, new experimental facilities, ongoing weapons maintenance and future rebuilds and recertification of existing weapons in the stockpile. In addition, the President has directed the Department, as part of the Stockpile Stewardship and Management program, to maintain the capability to resume nuclear testing, if required.

Stockpile Stewardship

Question [redacted] The Stockpile Stewardship Presidential Decision Directive (PDD) recommended a certain level of funding and an associated workplan to mitigate the decline in confidence in US nuclear weapons as a result of the decision to halt nuclear testing. In each year, DOE has requested and received significantly less funding than the amount called for in the PDD. DOE's Dr. Reis has urged that not less than $4 billion per year be spent on stewardship-related activities. (In FY 1996, DOE is requesting $3.6 billion for stockpile stewardship.)

Is it true that the FY 1996 request for Stockpile Stewardship is $200 million below the amount directed by the President in the PDD?

Answer: The PDD directed that the Department of Energy and Defense and the Office of Management and Budget ensure that sufficient budgetary resources are made available to accomplish the objectives of the PDD. A goal of $1.2 billion was identified in the original Stockpile Stewardship Plan developed in conjunction with the PDD, subject to the regular authorization and appropriation processes. Since that time, the scope and definition of stockpile stewardship has been refined and more appropriately focussed and integrated within a longer term timeframe. We believe that our FY 1996 request aggressively supports the major priorities outlined in the PDD.

Stockpile Stewardship

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I understand you believe that $4 billion per year is needed to implement the current stockpile stewardship and management programs. In what year will DOE propose a $4 billion budget for these activities?

Answer: The preliminary cost analysis suggests, that in the absence of a series of ongoing and planned program and management improvements in the way the Department of Energy operates, the Stockpile Stewardship and Management Program would require increased funding after fiscal year 1996. The Department's National Security Five-Year Plan, based on the assumptions used in preparing the fiscal year 1996 budget, projected that without reinvention, funding requirements for the Stockpile Stewardship and Management Program would rise from $3.6 billion in fiscal year 1996 to about $4 billion by fiscal year 1998. The Department is, however, aggressively changing the way it does business. It is anticipated that the Department's initiatives will lower the funding required during the 1997-2000 fiscal years while accomplishing the Department's national security mission.

Technology Transfer

Question [redacted]: The Stockpile Stewardship Presidential Decision Directive (PDD) recommended a certain level of funding and an associated workplan to mitigate the decline in confidence in US nuclear weapons as a result of the decision to halt nuclear testing. In each year, DOE has requested and received significantly less funding than the amount called for in the PDD. DOE's Dr. Reis has urged that not less than $4 billion per year be spent on stewardship-related activities. (In FY 1996, DOE is requesting $3.6 billion for stockpile stewardship.)

Would you agree that certain "technology transfer" activities, such as biochemistry, oil and gas recovery, and textiles, that are funded out of the DOE/Defense Programs account, have little direct (or indirect) application to the nuclear weapons mission? Would termination of these activities or shifting funding responsibility for them outside the "DP" account hinder nuclear weapons mission? Why?

Answer: The primary benefits of all Defense Programs technology transfer projects are the development of underlying technologies critical to the DP mission. Over the last year greater emphasis has been placed on direct support of core weapons needs. The Medical Systems Engineering Initiative, the National Information Infrastructure (NII) and the American Textile Partnership (AMTEX), discussed below, are valuable adjuncts to the Department's core weapons needs.

The Medical Systems Engineering Initiative uses the integrated, systems approach of the laboratories in applying innovative technologies in scientific research, engineering, manufacturing and computational capabilities to meet our national security mission needs, and to provide a dual-benefit to medical technology. These innovative technologies have application to the weapons program as they contribute to the assembly and disassembly techniques used in fiber optics packages in warheads and remote weapons disassembly.

The National Information Infrastructure Initiative applies information technology to reduce cost, share information and promote innovation within a global virtual environment. The benefit to the weapons program is in improvements in communication infrastructure, distributed computing and collaborative tools, mass storage, information security and surety, and information management. The Oil and Gas industry is the most appropriate partner in this endeavor as its technology needs are closely aligned with the Department's.

The AMTEX seeks to reverse the trend in loss of market share to offshore companies, improving the industry's competitive position by making significant step-changes in the cost and quality of American made products. Improvements derived from this project will benefit Defense Programs computer hardware for weapons guidance systems, sensors for automated manufacturing, advanced communications and information management systems and advanced lasers.

These projects all seek improvement in technology areas that are essential to the weapons program. Each project is intimately woven into the goal of maintaining the skills and technology necessary for the Department's national security mission. Termination or shifting funding of these activities would disrupt the progress of technology development and would result in lost

ground in achieving benefits for the weapons program. The technical work that has been planned and initiated for these activities would be ill served by the stopping or delaying their completion. During the development of the scope of work, we have coordinated with other DOE offices and laboratories to assure that the industrial partners and tasks match the respective missions of the sponsors and offer substantial advantages for the related weapons programs.

Consolidation of Nuclear Weapons-Related Activities Within the DOE Complex

Question [redacted]: One of today's witnesses, DOE's Dr. Reis, is developing a plan (known as the "2010 Plan") to consolidate at a small number of sites (perhaps as few as three or four) the nuclear weapons-related functions (such as design, production, and dismantlement) once performed by dozens of facilities.

Please describe the key elements of the "2010 Plan" you are developing. What are the objectives of this effort, and what is its status?

Answer: The Department is currently engaged in a strategic planning effort to further define the functions, facilities, and budgets needed to support the Stockpile Stewardship and Management program in the long term. The planning process will also examine a variety of complex configurations and implementation strategies designed to move us from the complex of today to that of the year 2010--both in terms of physical layout as well as qualitative and quantitative capabilities. No decisions have been made yet regarding alternative configurations of the complex. Alternatives will be evaluated in the context of a Programmatic Environmental Impact Statement on Stockpile Stewardship and Management.

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How many facilities and sites currently comprise the DOE Defense Programs infrastructure? Which would be retained and why?

Answer: The current Defense Programs infrastructure is made-up of eight major facilities in seven states (Lawrence Livermore National Laboratory, Sandia National Laboratory, Los Alamos National Laboratory, Pantex Plant, Nevada

Test Site, Oak Ridge Y-12 Plant, Kansas City Plant, and the Savannah River Site). No decisions have been made yet regarding the future DOE Defense Programs infrastructure.

Alternatives for the future Defense Programs infrastructure will be evaluated in the Stockpile Stewardship and Stockpile Management Programmatic Environmental Impact Statement (PEIS). The PEIS process will establish the baseline for the future weapons complex.

Consolidation of Nuclear Weapons-Related Activities Within the DOE Complex

Question[redacted]: One of today's witnesses, DOE's Dr. Reis, is developing a plan (known as the "2010 Plan") to consolidate at a small number of sites (perhaps as few as three or four) the nuclear weapons-related functions (such as design, production, and dismantlement) once performed by dozens of facilities.

If implemented, what would be the fate of facilities such as the Savannah River Site and the Pantex facility?

Answer: The current Defense Programs infrastructure is made-up of eight major facilities in seven states (Lawrence Livermore National Laboratory, Sandia National Laboratory, Los Alamos National Laboratory, Pantex Plant, Nevada Test Site, Oak Ridge Y-12 Plant, Kansas City Plant, and the Savannah River Site). No decisions have been made yet regarding the future DOE Defense Programs infrastructure.

Transfer of Weapons-Related Missions From DOE to DOD

Question[redacted]: Some in Congress have called for abolishing DOE and transferring its functions to another entity or entities. For example, some have recommended transferring the nuclear-related functions of DOE to the Defense Department. Others have called for establishment of an independent agency to perform these functions.

Should DOE retain the nuclear mission? What are the reasons for not transferring DOE's nuclear responsibilities to the Department of Defense or some other entity or entities?

Answer: The Department of Energy (DOE) should retain the nuclear mission. DOE, its laboratories, and contractors are the preeminent authorities in this country regarding the production of nuclear weapons and the associated materials. The horizontal integration of the nuclear weapon activities within DOE and its

"cradle-to-grave" responsibilities for nuclear weapons results in a commitment, continuity, and management flexibility important to program success.

There are clear distinctions between the nuclear weapons activities of DOE and the Department of Defense (DOD). These distinctions include not only the differences in size, but also in organization, management approach, and unity of mission. The dual-agency sharing of safety, security, and control responsibilities is the most important feature of the existing arrangement. The leverage exerted on safety, security, and control by an independent DOE balances the military operational perspective which might otherwise receive a disproportionate weight in design and procedure decisions.

Finally, the success of the Stockpile Stewardship program will likely be dependent upon the continued vitality and expertise of the nuclear weapons laboratories. Shifting these laboratories to the Department of Defense would risk the laboratories being sub-optimized to meet a narrower defense-only mission, thus eroding the vitality of the laboratories at an important and historic juncture in the weapons program. The recent study prepared by Robert Galvin, "Alternative Futures of the Weapons Laboratories," and submitted to Congress on February 1, 1995, concludes "there is no compelling reason for DOD to manage the national security functions" at the weapons laboratories. Experts, including the Chairman of the Defense Nuclear Facilities Safety Board, John Conway, and Dr. Edward Teller of Lawrence Livermore National Laboratory, have testified before the Congress against transferring these functions to DOD. These experts fear that the competition between the military services and DOD laboratories would seriously impact the resources available to the three weapons laboratories and the nuclear weapons complex. It is also important to note that Secretary of Defense William Perry has, in a March 29, 1995, letter to the Chairman of the Senate Armed Services Committee, expressed his opposition to the transfer of nuclear weapons functions from DOE to DOD.

Transferring Nuclear Weapons-Related Missions From DOE to DOD

Question [redacted]: Some in Congress have called for abolishing DOE and transferring its functions to another entity or entities. For example, some have recommended transferring the nuclear-related functions of DOE to the Defense Department. Others have called for establishment of an independent agency to perform these functions.

Do you agree that concerns about civilian control over nuclear weapons are no longer relevant?

Answer: No. There are clear distinctions between the nuclear weapons activities of DOE (civilian) and DOD (military). These distinctions include not only the differences in size, but also in organization, management approach, and unity of mission. The dual-agency sharing of safety, security, and control responsibilities is the most important feature of the existing arrangement. The leverage exerted on safety, security, and control by an independent DOE balances the military operation perspective which might otherwise receive a disproportionate weight in design and procedure decisions. Presidential decision-making concerning weapons has profited from DOE's and the laboratories technical independence from the military. The current separation of roles and responsibilities ensures that safety issues are not subordinated to weapons performance considerations. The Galvin Task Force reinforces this perspective by concluding "there is much value at this time in maintaining an independent and technically expert organization to focus on nuclear stockpile issues and continue to ensure that decisions regarding the safety, control, and stewardship of nuclear weapons are raised to the high policy level that they deserve."

The inherent civilian role in, and control of, nuclear weapons must not be diminished. DOE's role in maintaining the nuclear weapons complex must continue, to preserve the civilian stewardship and oversight necessary for a safe, secure, and reliable nuclear deterrent.

Tritium Resupply: Technical Options, Siting, and Timing

Question: According to the most recent Stockpile Memorandum, the U.S. will need a new source of tritium by not later than 2009-2011. (This assumes that the START II treaty with Russia is ratified and implemented.) DOE has considered three technical options for producing tritium (a dedicated reactor, an accelerator, and a commercial reactor in time of emergency) and has unofficially endorsed accelerator production of tritium. And, although DOE is formally reviewing five sites for the tritium production mission, two sites are considered front-runners (Savannah River Site in South Carolina and the Nevada Test Site).

How mature is the technology associated with using accelerators for tritium production, compared to the maturity level of reactors? Are both options technically feasible?

Answer: More technical work has been done on the reactor technologies than has been done on the Accelerator Production of Tritium (APT). However, the APT has been studied over the last several years and a preconceptual design for it has been completed. Accelerator technology has been proven over many decades and individual components of a tritium-producing machine represent demonstrated technology. However, the overall integrated system for the APT has not been demonstrated at the beam power and current necessary for the tritium mission. In addition, accelerators have traditionally been operated for scientific research purposes, and have never been taken for continuous, high power operations for production purposes. While the Department has high confidence that this is achievable, the demonstration of such continuous operating capability would be an important focus of system integration efforts over the next several years, should the accelerator be chosen as the tritium supply facility. The technical confidence in the ability of the accelerator to fulfill the tritium mission comes in part from the many independent technical reviews that have been conducted thus far. These reviews have included panels from the Massachusetts Institute of Technology, the JASON panel, and the Joint Advisory Committee for the Department of Defense. None of these reviews have identified any major obstacles that would prevent the success of the accelerator as a tritium source. All the candidate technologies (both reactors and accelerators) are considered feasible and currently judged capable

of meeting the 2011 date for a new tritium source and meet the required quantities.

Worker and Community Transition Program

Q. How does DOE plan to control costs in this program? What is DOE's estimate of the total cost of this program?

A. The Department has provided guidance for development of work force restructuring plans that establishes a target total cost per position eliminated of $25,000. The 14 plans approved through February 1995 have averaged just above this target at $26,762. This target was based on typical costs for separation programs in the private sector and for federal employees. A considerable portion of these costs would be incurred even without a work and community transition program through contract severance provisions. In many cases, separating employees earlier through voluntary programs results in greater savings than would result through warning and severance provisions for involuntary separations

The Department carefully reviews cost factors in reviewing work force restructuring plans in order to control expenditures. Between the FY 1995 budget and the FY 1996 request, a total of $500 million has been allocated to cover the direct costs of work force restructuring. Such funding is consistent with the $25,000 target for cost per position eliminated in light of our objective of reducing 19,000 contractor personnel during this period (Table 3). We are convinced this represents a prudent and necessary expenditure to achieve the long term savings included in the Department's budget plans.

Worker and Community Transition Program

Q. Have some DOE facilities been transferred or sold to local authorities for economic redevelopment? For how much? How many facilities could potentially be transferred or sold in this manner? What is the potential for leasing some of these facilities?

A. The Pinellas Plant in Largo, Florida has recently been sold to the Pinellas County Industry Council for $2.6 million. While remediation of the Pinellas Plant continues DOE will lease most of the site over a 30 month period, at a rate equal to the sales amount. DOE has also recently published an "Expression of Interest" in the Commerce Business Daily to sell the Oxnard, CA site when the Defense Programs mission ends there in December, 1995.

The Fernald, Hanford and Mound sites are also undergoing environmental restoration activity. Due to the more extensive contamination at these sites, including uranium, plutonium, milltailings and tritium, their remediation will require a longer time to complete. The transfer or sale of these facilities is dependent upon the extent of cleanup completed and protection of human health and the environment

"Clean parcels" in the environmental remediation process may be leased to community-based "Community Reuse Organizations" or their designees. Two buildings at the Mound Plant are now being leased by 12 businesses. Several buildings are now being evaluated at the both the Hanford and Rocky Flats Sites for commercial reuse. The ultimate availability of other unneeded DOE buildings and equipment/machinery for lease or loan to support commercial enterprises is primarily dictated by market demand and by safety and health considerations

Fissile Materials Disposition Options

Q. How much highly enriched uranium and how much plutonium are currently being stored and where? How will the implementation of START I & II affect these totals? Does the current method of storage pose a significant health risk to those living nearby the storage areas?

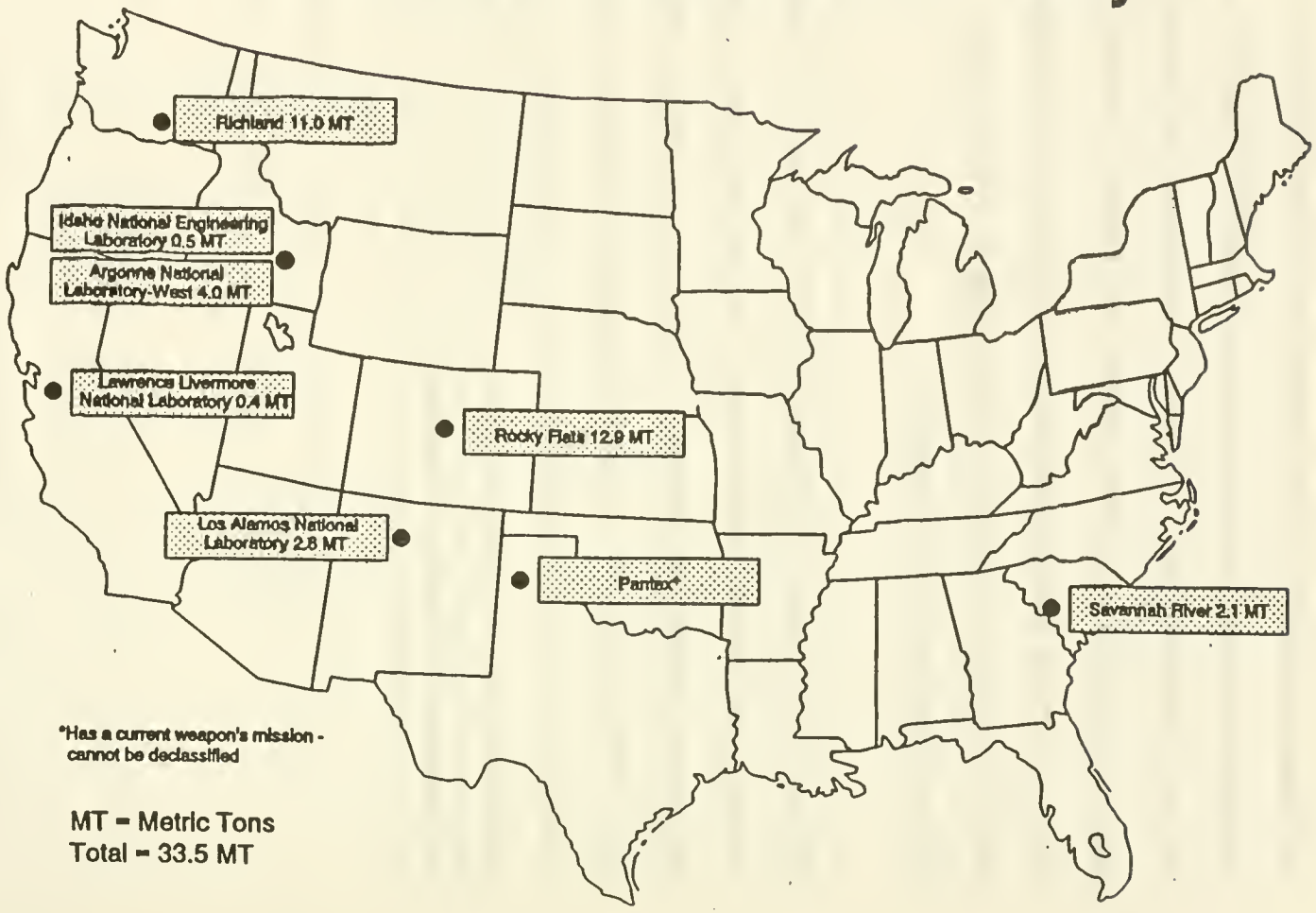
A. The Department of Energy's inventories of highly enriched uranium and plutonium are shown in the attached unclassified charts.

There are two Department of Energy (DOE) locations which will be affected by the implementation of START I & II: the Pantex Plant at Amarillo and the Y-12 Plant at Oak Ridge. DOE plans to transfer highly enriched uranium (HEU) from dismantled weapons to the Y-12 Plant, where it will be added to the existing inventory of HEU pending decision on the ultimate disposition of surplus HEU. DOE plans to add the weapons grade plutonium from dismantled weapons to the existing inventory at the Pantex facility pending decisions on the ultimate disposition of surplus plutonium. All these plans are subject to ongoing Natural Environmental Policy Act reviews.

The Department completed in 1994 a thorough study of safety and health vulnerabilities associated with storage of plutonium at DOE facilities (the "Plutonium Vulnerability Study"). That report concluded that there are significant potential safety hazards for workers at affected DOE facilities. The public is affected less because of the protection afforded by the design of the facilities, the specialized procedures and equipment utilized within the facilities, and the facilities' distance from the site boundaries.

With respect to the storage of highly enriched uranium, past internal and external oversight reviews have not revealed imminent safety and health threats to those living near the affected sites. However, a DOE-wide study of safety and health vulnerabilities associated with storage of highly enriched uranium is now in the planning stage. Subject to the availability of funds, the Assistant Secretary for Environment, Safety and Health will complete this study in fiscal year 1996 and the Committee will be informed of its results.

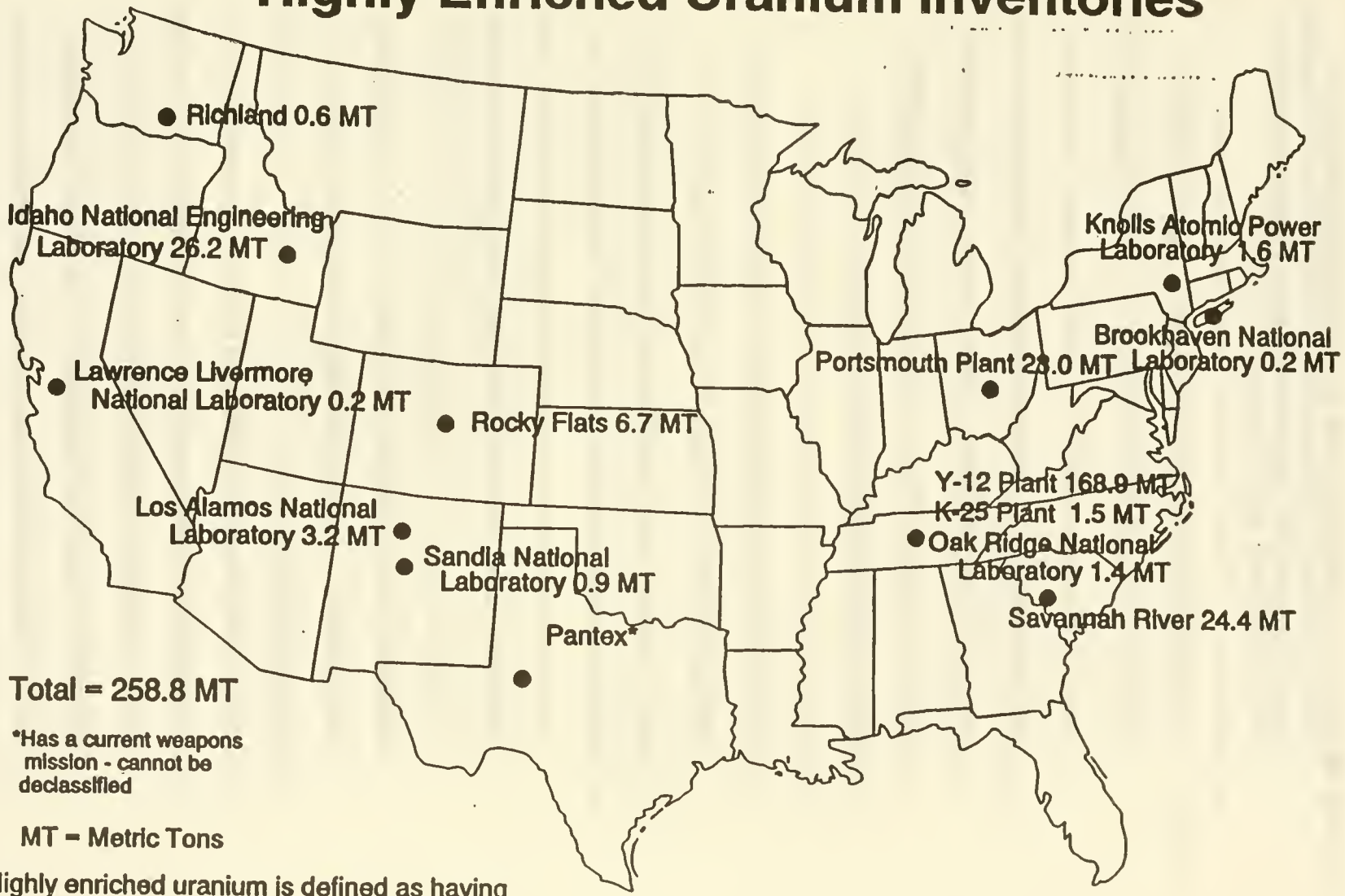
Plutonium Inventories Today



*Has a current weapon's mission - cannot be declassified

MT = Metric Tons
Total = 33.5 MT

Today's Department of Energy Highly Enriched Uranium Inventories



Total = 258.8 MT

*Has a current weapons mission - cannot be declassified

MT = Metric Tons

Highly enriched uranium is defined as having an enrichment above 20 percent U-235

Question [redacted] What is the anticipated total cost to implement the US-North Korea Nuclear Agreement? What percentage of this total cost is the US expected to pay? How does DOE plan to spend the $15 million for implementing the US-North Korea nuclear agreement in FY 1996?

Answer: a) The total cost to implement the US-DPRK Agreed Framework is estimated to be roughly $4 billion for the two reactors, $300-500 million for heavy fuel oil, approximately $18-20 million for storage of the spent fuel, and $100-200 million for the eventual transfer and final disposition of the spent fuel. Whether KEDO will choose to commit additional funds for infrastructure improvements and/or assistance with dismantling North Korean nuclear facilities is unknown at this time.

b) The Administration is asking Congress for $22 million in FY 1996 funding for the State Department to support KEDO's activities. The current estimate is that after 1996, we will request from Congress $20-30 million per year to support KEDO's activities. The Administration has also sought and received approval from Congress to reprogram $10 million in the DOE budget in FY 1995 and has requested up to $15 in FY 1996. In subsequent years, the DOE requirement will be approximately $500 thousand to $1 million per year for 7-10 years. If these levels of funding are appropriated, the U.S. share of total costs would be in the neighborhood of 5%.

c) The Agreed Framework commits the United States to expert-level meetings with the DPRK regarding safe storage of the spent fuel. In those meetings, the United States and North Korea agreed to a division of responsibilities to accomplish treatment of the water and safe storage of the fuel. Within the United States government, the Department of Energy has accepted the responsibility for the water treatment and fuel canning. If the United States does not discharge these responsibilities as agreed, it undermines the Agreed Framework. Assuring that the spent fuel from the 5 megawatt reactor, which contains enough weapons-grade plutonium for 5

or 6 bombs, is safely stored and eventually removed from the DPRK was one of the primary U.S. goals in negotiating the U.S.-DPRK Agreed Framework. Prompt action is required, or the U.S. workers who perform the work could be exposed to much higher levels of radiation than necessary.

DOE plans to spend the $10 million in reprogrammed FY 1995 funds and $5 million in its FY 1996 budget for activities related to storage of the spent fuel in North Korea. The FY 1995 $10 million will be enough to fund the water treatment and canning contracts through FY 1995 and into 1996. The $5 million in FY 1996 will be used to complete these activities and prepare the water treatment and canning equipment for maintaining safe storage during the 7-10 years before the fuel is removed. The Department plans to request an additional $500 thousand to $1 million for each year until the fuel leaves North Korea for monitoring the safety and condition of the spent fuel.

Q. Will any of this material be made available for International Atomic Energy Agency (IAEA) inspections?

A. On September 27, 1993, President Clinton announced that the United States would submit fissile material no longer needed for the U.S. nuclear deterrent to IAEA inspections. More than 10 tons of such material has been made available for IAEA inspection at two DOE sites, with a third site to be added this summer. The President's March 1, 1995, statement did not address whether any of the 200 tons of fissile material to be permanently withdrawn from the U.S. nuclear stockpile would be submitted to IAEA safeguards. Any decision concerning disposition of this material must take into account important factors that include security, health and safety, alternative disposition options, nonproliferation goals, and budgetary constraints. The Department of Energy has been tasked with identifying and evaluating options for implementing President Clinton's March 1 initiative for consideration by the National Security Council.

Q[redacted]. How will a Comprehensive Test Ban Treaty prevent a rogue regime from developing or acquiring a first-generation nuclear capability? In this regard, what do the Iraqi and North Korean examples tell us about the relationship between nuclear testing and achieving a nuclear capability?

A[redacted]. When President Clinton announced in his Radio Address of July 3, 1993, that the U.S. would pursue a Comprehensive Test Ban Treaty (CTBT), he stressed its role as a nonproliferation measure. However, the U.S. does not claim that a nuclear test is essential for development of a simple fission device or that a CTBT would be a panacea for global nuclear proliferation. However, a CTBT will make it difficult for Treaty parties to develop second generation nuclear weapons, i.e., sophisticated fission or thermonuclear weapons, that would form the basis of a deployable weapon system stockpile. Furthermore, a comprehensive and verifiable CTBT will establish a global standard against nuclear testing for parties and non-parties alike.

Q[redacted]. What is the status of the negotiations in Geneva on a Comprehensive Nuclear Test Ban Treaty? Please describe the current negotiating positions of the U.S., Russia, China, France, and the United Kingdom.

A[redacted]. During the first session of the 1995 Conference on Disarmament (CD) the CTBT "rolling" draft text inherited from the 1994 session was improved, discussions among the P-5 (United States, United Kingdom, France, Russia, and China) continued toward resolving issues uniquely affecting the nuclear weapon states, and verification experts worked to narrow options for the international monitoring system architecture.

The United States continues to work to conclude CTBT negotiations at the earliest possible time. The United States, Russia, United Kingdom, and France continue to observe nuclear testing moratoria. Progress was made on scope language when on the final day of the first session the United Kingdom and France dropped their demand for periodic safety tests. However, the Chinese continue to insist on a separate treaty article allowing for the conduct of so-called peaceful nuclear explosions.

Q. What is the estimated cost to date of the Secretary's so-called "Openness Initiative"? What is the projected total cost? Can you assure the Committee that none of the information released to date, or being proposed to be released, will help a would-be proliferator?

A. Secretary O'Leary's Openness Initiative will cost approximately $9.3 million in FY 1995 for declassification and development of automation improvements intended to increase productivity in the document declassification process. The FY 1996 request includes $8.1 million for declassification, which is the anticipated future funding requirement for several years to declassify the estimated 13.6 miles of old documents.

The Department's declassification process does assure that national security and nuclear nonproliferation objectives are not jeopardized. A comprehensive review is carried out for each and every declassification action. The information is reviewed for its national security significance, including proliferation concerns. In addition, there is an interagency review process that includes the Department of State, the Arms Control and Disarmament Agency, and the Department of Defense.

Q. What are the objectives and what is the cost of the Lab-to-Lab program?

A. The primary goal of the lab-to-lab program is to secure weapons-useable nuclear materials in the Russian Federation in a timely manner. At this time, the program includes aspects of the civilian nuclear complex, nuclear weapons complex, and independent research and development institutes, and is reaching out to naval facilities. As a result of this effort, the intention is joint development of systems that are maintained in Russia by Russian technical personnel. In doing so, the Russian safeguards base and the Russian industrial infrastructure must also be developed. To achieve these objectives, the Department has employed a three pronged approach to cooperation, which includes the following objectives:

- upgrading MPC&A systems at facilities;
- deploying technology; and
- developing national systems and standards.

The cost of ensuring these objectives are met are modest compared to the potential costs if nuclear material should get loose.

Beginning in FY 1996, DOE will be responsible for all of the programs for nuclear material protection, control, and accounting with the Former Soviet Union. Therefore, the FY 1996 budget request includes funding for the lab-to-lab and government-to-government programs, as well as funding for direct cooperation with Gosatomnadzor. The total projected cost to conduct these programs from FY 1996 through FY 2002 is about $400 million.

Q. What is the relationship between the DOE-sponsored Russian material control and accounting program and the DOD managed and funded Cooperative Threat Reduction ("Nunn-Lugar") program? Who's in charge of this effort? How much redundancy exists between these programs?

A. In FY 1995, the DOE-sponsored material protection, control, and accounting (MPC&A) programs through laboratory-to-laboratory cooperation while the government-to-government MPC&A cooperation is carried out through the Cooperative Threat Reduction (CTR) program. These two methods of cooperation on MPC&A were designed to remain separate but to complement each other.

Both the lab-to-lab and the Nunn-Lugar sponsored programs work to upgrade MPC&A systems at facilities and to deploy technology. Currently, the lab-to-lab program has a broader scope and a quicker pace. The government-to-government program is a necessary, but not independently sufficient, effort to achieve national systems and standards through its work with Gosatomnadzor (GAN). The Department has requested additional funding to increase the scope of cooperation with GAN in order to increase the pace at which the Russian national system is implemented. Ultimately, it will be national systems and standards which regulate the MPC&A systems throughout the Russian nuclear complex.

The programs are managed by the Office of Arms Control and Nonproliferation of the Department of Energy. However, the programs are closely monitored at the highest levels in the Department. Since all of these parallel efforts are managed by the same office in DOE, the chance of redundancy is significantly

reduced. Each has management groups with overlapping personnel, who can provide information on ongoing activities. As the programs evolved separately, their structure and mechanisms to achieve progress are different but the elements of the overall program work together to achieve the singular goal of improving nuclear material security in the Former Soviet Union.

Additionally, in FY 1996, the Department of Energy will be responsible for all MPC&A programs with the former Soviet Union, whether government-to-government or laboratory-to-laboratory, thereby further reducing the possibility of redundency of effort.

Q What steps have been taken to ensure that no critical nuclear design information is revealed during IAEA inspections of U.S. nuclear materials and weapons components? Has the IAEA been shown any nuclear weapons pits? Will they be?

A Critical nuclear design information is Restricted Data under the Atomic Energy Act of 1954. U.S. law and international treaty obligations prohibit sharing Restricted Data with the IAEA. The nuclear materials which are currently subject to IAEA inspection were carefully selected to ensure that they do not contain Restricted Data. The design of weapons components, such as pits, is Restricted Data, and these components have not been inspected by the IAEA. The IAEA has not been shown other weapons components. If an approach can be developed which allows IAEA inspection of pits or other weapons components in sealed containers without revealing Restricted Data, it may be possible to make some weapons components, containing material no longer needed for our deterrence, available for future IAEA inspections.

Q Both Iraq and North Korea were signatories to the Nuclear Nonproliferation Treaty (NPT), which is being reviewed for possible extension this year. Yet one came dangerously close to achieving a nuclear capability (Iraq) and the other probably has a bomb or two (North Korea). How important is the NPT to preventing nuclear proliferation, and why didn't it stop North Korea -- and almost Iraq -- from gaining a nuclear capability? What's being done to improve the effectiveness of the Treaty?

A The NPT is the cornerstone of US and international nonproliferation efforts. It forms the legal basis for the conduct of International Atomic Energy Agency

(IAEA) safeguards in over 90 countries. These safeguards serve as both an effective warning device and as a deterrent against the diversion of nuclear materials. The NPT's indefinite extension is a major priority for this administration and is vital to the future effectiveness of the global effort to prevent the proliferation of nuclear weapons.

After the Gulf War, Iraq's violation of the NPT and its safeguard arrangements became clear. In the wake of those discoveries, the IAEA, with the assistance of the United States, took concerted steps to improve the efficiency and effectiveness of the IAEA safeguards regime. The IAEA has reasserted its right contained in NPT-style safeguard arrangements (INFCIRC 153) to conduct special inspections at non-declared sites and to receive information from member states about potential violations in safeguarded countries. In addition, the IAEA is currently reviewing a major plan to improve the overall safeguards regime, known as the 93+2 plan.

It is important to note that Iraq was generally deterred from using safeguarded facilities for weapons purposes. IAEA safeguards constrained the Iraqi weapons program by forcing Iraq to develop entirely clandestine sites, greatly increasing the cost and time needed for the program to advance. The IAEA's ability to detect such sites since that time has been greatly increased. In addition, it was Iraq's violation of the NPT and IAEA safeguards that formed the basis for sanctions under UN Resolution 687 that have enabled the UN Special Commission and IAEA to conduct their extensive activities in Iraq. Even after it was violated by Iraq, the NPT served as an important standard against which to judge and punish Baghdad's behavior.

North Korea's nuclear program developed over the 1980's and antedated their membership in the NPT. Subsequently, IAEA requests for special inspections alerted the international community to precise concerns over North Korea's nuclear program. Moreover, the NPT is the standard against which North Korea's

behavior is judged, a standard that enables the international community to stand up to Pyongyang's attempt to bypass its nonproliferation obligations. Had North Korea refused to join the NPT, the basis for international action would have been much weaker. The IAEA continues to play an important role in North Korea, monitoring North Korea's pledge to freeze its nuclear activities. A major goal of the United States is to fully implement the October 21, 1994 Agreed Framework, including North Korea's full compliance with the NPT and its safeguard obligations.

Q. What is the status of US efforts to indefinitely extend the NPT when it comes up for review this year? Does the US have the votes yet for indefinite extension? Is indefinite extension a reasonable goal? Why or why not?

A. The United States supports the indefinite extension of the Nuclear Nonproliferation Treaty (NPT). We believe that the 1995 conference represents, in essence, the one and only chance to make this important treaty a permanent instrument for peace and security. A significant percentage of NPT members have publicly endorsed the option of indefinite and unconditional extension. The United States is confident that a wide majority of states, as required by the Treaty, will vote for indefinite extension. The United States continues to strive for the widest possible majority in favor of indefinite extension to reinforce the vitality of this very important document.

Q. Hasn't North Korea already violated the spirit if not the letter of the agreement by refusing to accept South Korea-designed light water reactors?

A. This is a question best answered by the State Department. The Department of Energy's responsibilities pursuant to the Agreed Framework concern North Korean spent fuel. That said, the October 21, 1994 Agreed Framework does not specify that the nuclear reactors to be built in the Democratic People's Republic of Korea be of South Korean origin. I am informed, however, that North Korea was aware all during our negotiations that the ROK would provide the bulk of funding for the reactor project and was expected to take a leading role in the reactor's construction. Moreover, North Korea has agreed that the reactors to be provided would be picked by Korean Peninsula Energy Development Organization (KEDO). The United States anticipates that there will be numerous

issues, debates and disagreements between ourselves and North Korea over the implementation of this agreement. The United States position is, however, that there is no viable alternative to South Korean reactors for the light water reactor project in North Korea.

Q Does this agreement set a dangerous precedent by rewarding proliferation? Why not?

A The October 21, 1994 Agreed Framework between the United States and the Democratic People's Republic of Korea does not reward proliferation or misbehavior by North Korea. It attempts to deal with a state that reflects the legacy of the Cold War and with a nuclear program that began prior to North Korea's NPT membership. In dealing with these circumstances, the U.S. has sought to ensure that the benefits that North Korea would accrue through the Agreed Framework would come in response to its accepting nonproliferation requirements even more strict than those contained in the nuclear Nonproliferation Treaty. For example, North Korea will not keep or stockpile spent research reactor fuel, which is to be shipped out of that country. In fact, the Agreed Framework suggests that there are greater benefits to be obtained through nonproliferation than through the production of weapons usable plutonium.

Moreover, as no key reactor components will be delivered to North Korea until it accepts full International Atomic Energy Agency safeguards and the IAEA is satisfied that all nuclear materials in North Korea are under safeguards and accounted for, the United States can ensure that North Korea is not rewarded in any way for violations of the NPT, its IAEA safeguards agreement or the Agreed Framework. The Framework does not provide a reward for proliferation, it provides substantial incentives for compliance with nonproliferation commitments.

Should North Korea not comply with the agreement, we would still have benefitted from the duration of their freeze on plutonium production and established a firm basis for international sanctions.

The following questions were sent to and answered by:
Dr. Harold P. Smith, Jr.
Assistant to the Secretary of Defense (Atomic Energy)

COMPREHENSIVE NUCLEAR TEST BAN TREATY

QUESTION: What is the status of the negotiations in Geneva on a Comprehensive Nuclear Test Ban Treaty? Please describe the current negotiating positions of the US, Russia, China, France, and the United Kingdom.

ANSWER: Multilateral Comprehensive Test Ban (CTB) negotiations, which are taking place in the Conference on Disarmament in Geneva, will enter into their fifth round on 29 May 1995. The negotiations to date have produced a so-called "rolling" text of the Treaty -- a working draft that contains bracketed language, each bracket containing the position on a given issue of one of the 38 states participating in the negotiations. All of the declared nuclear weapons states agree that any CTB Treaty must not prohibit activities required to maintain the safety and reliability of their respective nuclear stockpiles. The question of what these activities might be is one of the most complicated and challenging issues in the negotiations. Because each nuclear weapon state has different requirements, stockpiles, technologies, and capabilities, so are the activities they must carry out for stockpile safety and reliability. Complicating the issue still further are the views of some non-nuclear weapon states -- particularly the non-aligned nations -- who believe that the treaty should not permit any stockpile maintenance activities. There are also disagreements on the scope of the treaty -- namely prohibited and not prohibited activities. In this regard, Russia wants the treaty to prohibit nuclear explosions that are held within a container. China wants to permit nuclear explosions for peaceful purposes and include other policy issues, e.g., no first use.

NONWEAPON RESEARCH AND DEVELOPMENT

QUESTION: A key concern for the long-term maintenance of the nuclear arsenal is the retention and attraction of skilled personnel. What steps should we take to make sure we have this talent on hand in the future? Is there any non-weapons Research and Development that utilizes the same -- or similar -- scientific skills required for weapons R&D? In your opinion, how important is it to allow our weapons scientists to work on these types of projects? Please discuss in terms of retaining and attracting critical personnel.

ANSWER: The Stockpile Stewardship program directed by the President addresses the difficult task of maintaining core competence levels at the Department of Energy's laboratories and production facilities. The Department of Defense will continue to maintain a cadre of highly competent personnel who are well versed in the unique technical and operational aspects of the deployment of nuclear weapons. DoD has nuclear weapons professionals, both in and out of uniform, who are meeting the challenge to support the stockpile today and as long as the US continues to rely on nuclear weapons for deterrence.

HEALTH AND STATUS OF THE US NUCLEAR STOCKPILE

QUESTION: Do you agree that there has been a significant erosion in the US nuclear infrastructure over the past few years? How long will this erosion continue?

ANSWER: The infrastructure of the nuclear weapons complex has been significantly reduced since 1989, to reflect the change in US stockpile requirements. The DOE Defense Programs budget request for FY 1996 appears to stop major reductions in the nuclear infrastructure. At the same time it supports many initiatives that DOE considers to be vital to continued confidence in the stockpile. We will continue to work with DOE to ensure that the size and capability of the complex will meet our needs as well as have the capability to address reasonable contingencies.

QUESTION: Can DOE guarantee confidence in the safety, reliability, and performance of nuclear weapons over a period of decades without nuclear testing?

ANSWER: Maintenance of a safe and reliable enduring stockpile of nuclear weapons is in the supreme national interest of the United States. It may be possible, though by no means easy, to have a stockpile stewardship program capable of furnishing an adequate level of confidence in the enduring stockpile without testing. Our level of confidence will depend on the nature and scope of the problems that arise in the enduring stockpile. Science Based Stockpile Stewardship is one approach that will address the need for confidence during a moratorium on testing. To date, this stewardship plan has not been systematically presented.

DOE'S SCIENCE BASED STOCKPILE STEWARDSHIP PROGRAM

QUESTION: Is there a risk that future weapons designers might have false confidence in their abilities, unproven by nuclear tests, that could lead them to make changes to nuclear weapons that would make them less reliable? Is there a risk that DOE's focus on science per se will weaken the focus on performance, and that building a massive science edifice will instill a false sense of confidence that a more conservative military approach would not accept?

ANSWER: There is a risk that future weapons designers might have false confidence; however, the weapons scientists at the nuclear weapon laboratories are naturally conservative in weapons design matters. The process of peer review is the best way to minimize -- but not eliminate -- any risk of false confidence. The competitive spirit engendered by a robust program of peer review will reinforce the professionalism and attention to detail that have made the national laboratories the preeminent centers of nuclear physics research. The Department of Defense must also become a more informed customer -- more able to judge the merit of the evaluations -- in order to better serve itself, DOE, and the nuclear community in general.

STOCKPILE STEWARDSHIP PROGRAM FUNDING

QUESTION: Would you agree that certain "technology transfer" activities, such as biochemistry, oil and gas recovery, and textiles, that are funded out of the DOE/Defense Programs account, have little direct (or indirect) application to the nuclear weapons mission? Would termination of these activities or shifting funding responsibility for them outside the "DP" account hinder the nuclear weapons mission? Why?

ANSWER: It is DoD's understanding that technology transfer activities are being phased out of the DP budget for the reasons stated in your question. Placing them under other jurisdictions will help to provide focus for Defense Programs budgets in the years to come.

CONSOLIDATION OF NUCLEAR WEAPONS RELATED ACTIVITIES WITHIN THE DOE COMPLEX

QUESTION: Has the Defense Department taken a position on the 2010 Plan? Is there a danger of over-consolidation?

ANSWER: The DoD has not been requested to formally review the 2010 plan..

TRANSFERRING NUCLEAR WEAPONS-RELATED MISSIONS FROM DOE TO DoD

QUESTION: Is there any reason why the Department of Defense could not perform this mission at least as well as the DOE? What are those reasons?

ANSWER: The current separation of roles between DoD and DOE provides a healthy degree of inter-Departmental review. By having two major Departments responsible for different aspects of the nuclear weapons life cycle, the President is provided a "peer review" of the entire nuclear weapons complex at the Cabinet level. If DoD were to assume the duties of DOE, this high-level oversight would be lost.

QUESTION: Do you agree that concerns about civilian control over nuclear weapons are no longer relevant?

ANSWER: There is no serious debate on this issue. Civilian control of nuclear weapons has served the country well for many years.

TRITIUM RESUPPLY: TECHNICAL OPTIONS, SITING, AND TIMING

QUESTION: Did the Nuclear Weapons Council endorse accelerator production of tritium over reactor production? Does the Council believe that reactors are not technically feasible? Did the Council endorse exploring international cooperation on tritium production or sales? What is under consideration in this regard and what are the pros-and-cons of such an approach?

ANSWER: The NWC endorsed accelerator production of tritium (APT) as one possible means of meeting the needs of the stockpile. Reactors are, of course, technically feasible and light water reactor technology is an attractive and valid contingency plan, should APT prove to be insupportable -- either technically, financially, or politically. The US should not put itself in a position of relying on foreign sources of tritium to meet the requirements of its nuclear deterrent. This approach would foster the production and international sale of an element whose primary purpose is for nuclear weapons.

QUESTION: Assuming START II is not ratified and implemented, when would the US need a new tritium source? Are you concerned that none of the options will be capable of producing tritium until 2009 at the earliest?

ANSWER: The source of tritium and composition and size of the enduring stockpile are of mutual concern to DoE and DoD. The need for tritium depends on the number and type of warheads in the stockpile. In general, the more weapons in the stockpile, the more tritium will be required. Some estimates of future stockpile size and composition predict a need for new tritium by the early part of the next decade. Current light water reactor technology could bridge the gap in the tritium supply line until accelerator production of tritium can be brought on line. DoD and DOE are working to more clearly define the expected composition and requirements of the future stockpile, along with an assured source and contingency technology for producing tritium.

LAB CONSOLIDATION/GALVIN COMMISSION RECOMMENDATIONS

One of the recommendations of the Secretary of Energy's Task Force on Alternative Futures for the DOE National Laboratories (the Galvin Commission) is that the Lawrence Livermore National Laboratory should transfer its support functions for maintenance of the nuclear weapons stockpile to the other weapons laboratories.

QUESTION: How important to maintaining confidence in the stockpile is "peer review"? Can peer review be accomplished with separate design teams at a single laboratory?

ANSWER: Peer review is a critical process in determining confidence in the stockpile. In the past, different approaches used at separate laboratories have been used to arrive at a consensus assessment of the degree of confidence in the stockpile. This process has served us well historically and should be supported to the greatest extent possible. Ideally, peer review should be accomplished by two physically separate and distinct laboratory teams who have current stockpile responsibilities. The laboratories have developed their own methods and institutional approaches to peer review which could coalesce into a single method if peer review were attempted at only one location.

QUESTION: Does the Department of Defense have a position on this issue? Dr. Smith, in your personal opinion, would the stockpile stewardship program suffer if Livermore were to lose its nuclear mission?

ANSWER: The Galvin report states: "The maintenance of a safe, secure, and reliable stockpile, contributions to critical proliferation and treaty issues, and participation in other national priorities related to this mission are essential parts of a nuclear weapons laboratory's future and require adequate facilities, motivated and capable people, and the requisite budget." Maintenance of an aging stockpile will require increased stockpile analysis and maintenance activities. The retention of two independent laboratories with design experience and current stockpile maintenance experience seems pivotal. Because of its history of achievement in nuclear weapons design, Lawrence Livermore is an important part of the peer review process. This process is best performed by two distinct laboratories separated by geography and philosophy.

CLINTON PLEDGE TO REDUCE THE STOCKPILE BY 200 TONS

QUESTION: Have DoD and DOE agreed yet on what constitutes "excess" fissile materials or weapons components? Do you have any concerns about this assessment? How would this calculation be affected if START II was not ratified and implemented?

ANSWER: The two Departments have already agreed that material that is not required for national security will not be used for weapons . Any decision concerning the ultimate disposition of this material will be addressed at the inter-Agency level and must take into account important factors that include classification and security, health and safety, alternative disposition options, and budgetary constraints. The delay in ratifying START II will not impact our judgments regarding the disposition of any material that is excess to national security needs.

QUESTION: How does the President's decision affect the maintenance of a Strategic Reserve of highly enriched uranium, weapons-grade plutonium, and tritium?

ANSWER: The material declared to be excess to national security needs will not affect the Strategic Reserve of fissile material or the production of tritium. The President's decision does not affect these quantities of nuclear material.

DOD REQUIREMENTS AS A RESULT OF THE NUCLEAR POSTURE REVIEW

As a result of the Nuclear Posture Review, which DoD completed and the President approved last September, DoD issued the following requirements to DOE: develop a stockpile surveillance engineering base; demonstrate a capability to refabricate and certify weapon types in the enduring stockpile; maintain a capability to design, fabricate, and certify new warheads; and maintain the science and technology base.

QUESTION: What is the DoD's response to DOE's plan for meeting these requirements? Is DOE's plan satisfactory? Why or why not?

ANSWER: DOE has yet to fully present their plan to meet these requirements. It is incumbent upon DOE to present their approach as soon as possible so that DoD can review it to see if it meets the requirements stated in the Nuclear Posture Review. DOE is developing enhancements to its surveillance program under their Stockpile Stewardship program. DoD is in the process of communicating specific requirements to demonstrate the capability to refabricate and certify a weapon.

QUESTION: It has been said that the types and yields of the nuclear weapons that will be retained in the stockpile are inappropriate to the emerging security environment -- that what we have are relatively large-yield warheads whereas what we need is warheads with much smaller yields. Do you agree with this assessment? Why or why not? Does DoD support the current prohibition on funding feasibility/concept studies of new warheads?

ANSWER: The US currently has weapons in the stockpile that are capable of producing a full range of yields. The number and type of these warheads are sufficient to "hold at risk" a variety of possible targets. For this reason, DoD is confident of our ability to meet the threats in the emerging security environment with the enduring stockpile. Though there are currently no requirements for a newly designed warhead, feasibility studies are an integral part of a pragmatic approach to possible requirements definitions.

DOE'S "TEST READINESS" POLICY AND PROGRAM

DOE proposes in FY 1996 to move to a three-year readiness option to resume underground testing at the Nevada Test Site. This represents a change from the current policy of retaining a capability to test within six months of a decision to conduct a test. Such a change would save money, because fewer skilled testing-related personnel would be needed, but it also calls into question the ability to conduct a near-term test or series of tests that might be required to diagnose or fix a problem with weapons in the stockpile.

QUESTION: Was DoD involved in this decision? Does DoD concur? From the DoD perspective, what are the implication of this decision?

ANSWER: Because the current stockpile is mature and well-tested, the Department of Defense does not object to the three-year readiness option -- provided the Science Based Stockpile Stewardship program can assure sufficient confidence in the enduring stockpile.

COMPREHENSIVE NUCLEAR TEST BAN TREATY

QUESTION: Is it true that the intelligence community has expressed grave concerns about the verifiability of a CTBT? What additional funds would be needed to effectively monitor a CTBT?

ANSWER: The methods of verifying compliance with any ban would depend on the specific activities that were not permitted under the ban. It is too early, at this point in the negotiations, to determine what these activities will be, what methods will be required to verify compliance, and consequently, what funds will be necessary to ensure the efficacy of these methods.

Response of

Siegfried S. Hecker, Director

Los Alamos National Laboratory

to

Follow-up Questions submitted by

Mr. Ike Skelton

Subcommittee on Military Procurement

Committee on National Security

United States House of Representatives

April 20, 1995

A key concern for the long-term maintenance of the nuclear arsenal is the retention and attraction of skilled personnel. What steps should we take to make sure we have this talent on hand in the future?

You have indeed identified what is the key concern for the future of our nuclear deterrent. As the Galvin Task Force stated, the highest priority for the future of the Laboratory is

"Attracting and retaining skilled scientists, engineers, and managers over the years ahead with the expertise required for the complex and demanding stewardship role".

Our ability to attract the outstanding scientists and engineers we will need rests primarily on the reputation of our Laboratory as a premier scientific establishment. As I said in my written testimony (attached), the Laboratory's identity and international recognition rest upon its sustained excellence in satisfying national needs in science and technology.

Because of funding constraints, the nuclear weapons program alone cannot continue to support the people and competencies required to adequately perform our defense mission. In order to maintain the ability to perform our core mission, we must compete for programs in other areas that can attract good people and help support these competencies. The key to our future success will be the extent to which we are able to maintain the diverse, multiprogram nature of our Laboratory and the synergy that supports defense as well as other national needs.

Therefore the most important single step that must be taken to preserve our scientific reputation and ability to attract top talent is to preserve the multiprogram character of our Laboratory. This means that our mission should include civilian science and technology, as well as our core defense responsibilities. It also means that we should strive to remain at the forefront of basic science as well as defense R&D.

Is there any non-weapons Research and Development (R&D) that utilizes the same—or similar—scientific skills required for weapons R&D? In your opinion, how important is it to allow our weapons scientists to work on these types of projects? Please discuss in terms of retaining and attracting critical personnel.

As I stated in my written testimony,

"Today, nonnuclear defense research and civilian basic research and technology done in partnership with universities and industry are crucial to our nuclear defense mission. Selected programs allow us to use our core technical competencies in the broader national interest to leverage nuclear weapons funding and help to provide a stimulating research environment that allows us to attract and retain world-class research talent to serve the nation."

Scientific research and development, whether for nuclear weapons technology or for civilian basic research or applications, has many commonalities. Los Alamos is fortunate in having the size and breadth of scope that allows us to have strong programs in many areas. These programs are able to attract outstanding researchers because they are strong and they are strong because of the quality of our people. The synergy that results from a broad scope has served us well since our inception. When problems arise in one area of the weapons program, we do not have far to go to obtain the expertise needed to solve that problem. We must maintain our expertise in, for example, materials and advanced computing, to preserve the flexibility that is needed to respond to emerging problems.

In my written testimony, I outlined areas in *basic research*, our spallation neutron source at LANSCE that brings outstanding scientists from around the world and leads to basic understanding of the nature of matter and materials; *energy and environment*, where work in energy technologies and climate modeling can support our energy security and future well-being; and *work for other federal agencies and industry* that supports our national transportation infrastructure and health care system, among other areas. I also described how we were using *partnerships with industry* to help support critical personnel for our defense mission. These partnerships will be a key part of our ability to integrate our stewardship role with the manufacturing needs of the nuclear weapons program.

The great strength of our Laboratory is the quality of the science and technology it is able to apply to its mission of *reducing the global nuclear danger*. Our outstanding scientists and engineers are the key to that quality. I welcome your interest in this important problem and thank you for the opportunity to clarify my statement before the Committee.

Response to Questions for the Record

SUBCOMMITTEE ON MILITARY PROCUREMENT

NATIONAL SECURITY COMMITTEE
US HOUSE OF REPRESENTATIVES

Testimony given on March 29, 1995

C. Bruce Tarter, Director
University of California
Lawrence Livermore National Laboratory

April 27, 1995

RESPONSES FOR THE RECORD TO
MR. SKELTON

Q: *A key concern for the long-term maintenance of the nuclear arsenal is the retention and attraction of skilled personnel. What steps should we take to make sure we have this talent on hand in the future?*

ANSWER: As I discussed in the concluding remarks of my prepared testimony, a key factor to the retention and attraction of skilled personnel to the nuclear weapons program—and more generally to the Laboratory—is program stability. Long-term maintenance of the nuclear arsenal requires a long-term commitment by the Executive branch and the Congress to a healthy nuclear weapons program imbedded in a healthy system of national laboratories with adequate, stable funding. Without program stability and stable funding, it is exceedingly difficult to retain skills and to recruit and hire top-notch personnel for the future.

A second key factor to the retention and attraction of quality personnel is that the technical program must be exciting and challenging. I believe that our nuclear weapons stockpile maintenance and stewardship program meets those criteria. In addition, there are ancillary and related programs at the Laboratory, which I discuss in answer to the subsequent question, which help us maintain nuclear weapon skills.

Our nuclear weapons stockpile maintenance and stewardship program offers many challenges for the technical staff. It is an active and aggressive effort to learn as much as we can through non-nuclear testing and computer modeling about the weapons Livermore has fielded in the enduring stockpile. We are not simply waiting for problems to develop as weapons age; we have a very active stockpile surveillance program using state-of-the-art evaluation techniques. In addition, we are using our most advanced computer codes, diagnostic tools and experimental facilities to improve the technical data base about the stockpile to help us recognize physical changes in weapons before they affect performance.

These scientific efforts will expand as we vastly improve computer modeling capabilities through the Accelerated Scientific Computing Initiative (ASCI) and introduce major new experimental facilities, including the National Ignition Facility (NIF). ASCI, the NIF and other investments in capability that are new initiatives in the FY1996 DOE Defense Programs budget will help us meet the scientific challenge of providing for the nuclear stockpile. They also serve as "magnets" to attract new talent to the Laboratory.

Q: *Is there any non-weapon Research and Development (R&D) that utilizes the same—or similar—scientific skills required for weapons R&D? In your opinion, how important is it to allow our weapons scientists to work on these types of projects? Please discuss in terms of retaining and attracting critical personnel.*

ANSWER: As you are aware, LLNL is a multiprogram national laboratory. We are engaged in multidisciplinary R&D projects in national security, energy, environment, and fundamental science that are high-risk, high-reward and require large, complex research facilities. This type work that LLNL pursues tends to attract highly capable scientists and engineers whose talents can be applied to a variety of projects throughout their careers.

Underpinning these Laboratory efforts are a set of core compentencies, special facilities, and scientific skills which are needed for the nuclear weapons program. Much of the other R&D work underway at LLNL complements and benefits the weapons activities. We strengthen the Laboratory and its programs by pursuing mutually reinforcing work efforts and by having a pool of talent available to pursue challenging problems as they arise. We have retained some of our very experienced nuclear weapon scientists that we would have otherwise lost through program shrinkage by engaging them in R&D programs that make effective use of their training and experience.

One important complement to our nuclear weapons activities is our program in stemming the proliferation of nuclear weapons and other weapons of mass destruction. As I described in my prepared testimony, it is a multifaceted effort in the areas of nonproliferation, counterproliferation, verification and intelligence support. It makes excellent use of our expertise in nuclear weapons technology, it is a nationally prominent effort that helps us attract new talent to the Laboratory, and it is an activity area that helps sharpen our skills in nuclear weapons issues.

The many and diverse high-performance computing activities at the Laboratory also benefit our nuclear weapons activities. Without advances in computer hardware and software we will not be able to achieve necessary simulation realism in our weapons physics models. Our complementary computing activities range from global climate modeling to R&D with industrial partners on technologies for high-performance computer storage.

Other industrial partnering activities also provide benefits to the weapons program. They provide opportunities to pursue advanced precision manufacturing technologies and materials science R&D that are needed for stockpile maintenance and stewardship and future remanufacture of weapon components. They also provide opportunities for the development of advanced diagnostics and instrumentation needed for stockpile surveillance.

Expertise on diagnostics and instrumentation also derive from our biosciences program and our many of our environmental activities, which center around our experience in characterizing, handling, and disposing of hazardous and radioactive wastes.

In addition, LLNL has an exceedingly strong laser program and inertial confinement fusion (ICF) program. As I highlighted in my testimony, the NIF will allow cutting edge research in high-energy-density physics, important to weapons research, ICF development as a source of commercial energy, and basic scientific research. It will draw talent to the Laboratory that will be important for stockpile stewardship.

In summary, there are a variety of activities at the Laboratory that are complementary to the weapons program and will serve as attractors of scientific and engineering skills to the Laboratory. This pool of talent will be available to contribute issues that arise in stockpile stewardship and maintenance.

Sandia National Laboratories Responses
House National Security hearing, March 29, 1995
Follow-up questions

1. A key concern for the long-term maintenance of the nuclear arsenal is the retention and attraction of skilled personnel. What steps should we take to make sure we have this talent on hand in the future?

   Ensuring the safety, security, and reliability of nuclear weapons requires a capable and committed R&D staff at the DOE/Defense Programs laboratories.

   The first requirement to ensure we have staff for the future is to make a clear, strong national statement about the importance of the stockpile to our national security and, at the same time, ensure continued congressional support. Good people want to work on important problems; staff morale and drive have suffered at the national laboratories as the laboratories' missions have become diffuse and fragmented and as administrative burdens have increased.

   In addition, real and challenging work must follow. Excellent staff can only be retained if they are continuously challenged with work that delivers real, added value. In this regard, the multiprogram environment is also essential for attracting top technical talent to the laboratories. Young scientists and engineers want to look forward to interesting careers that offer the opportunity for a variety of challenges and useful work. They do not want to be constrained within a very narrow mission focus for thirty or forty years. This is especially true for the DP national security mission. It will be very difficult to recruit top talent into the nuclear-weapons if multiprogram opportunities are not available. Bear in mind that a major rebuild of the weapons in stockpile will be required in about twenty year from now and most of our current nuclear-weapon engineers will have retired by then. Consequently, recruitment is of vital concern.

   Finally, to ensure the adequacy of skilled personnel for the long-term nuclear arsenal, the country needs to stabilize weapons-related core R&D funding and protect this funding from any out-year shortfalls that might arise from major, capital-intensive initiatives. A world-class base of scientific and technological excellence has always been the critical factor in meeting the extreme demands placed on nuclear weapons, especially in regard to weapon safety, security, and reliability. These are areas of major Sandia responsibility. Our ability to sustain this technical base has been made difficult over the years by a decline in weapon R&D funding that began as early as 1965 and has persisted since then with few reversals. Today, the ability of the nuclear-weapon program to preserve and strengthen Sandia's essential technical foundations stands at an all-time low. To assure the safety and reliability of the stockpile, we require

a sustained level of R&D funding adequate to support our technical foundations.

2. Is there any nonweapons R&D that utilizes the same – or similar – scientific skills required for weapons R&D? In your opinion, how important is it to allow our weapons scientists to work on these types of projects? Please discuss in terms of retaining and attracting critical personnel.

Over the past twenty years, Sandia has diversified its program portfolio in order to maintain capability for the defense mission and to meet additional, emerging Department of Energy mission responsibilities.

The R&D capabilities that constitute Sandia's foundation (engineering science, engineered materials and processes, computational and information science, and microelectronics and photonics) now have multiple applications to our work in nuclear weapons R&D, energy and environmental R&D, and work for other federal agencies, such as transportation and biomedical engineering.

Many of our technical staff move among these programs during their careers. This movement allows them to grow professionally, while Sandia benefits by keeping them at the laboratory for redeployment as needed.

Using the same capabilities for multiple missions serves two purposes: (1) we exercise and thus strengthen these capabilities, thus improving our ability to meet our primary nuclear weapons R&D mission, and (2) these capabilities are better exploited and thus provide greater return on the taxpayers' original investment.

Furthermore, collaboration with colleagues in the private sector and in universities is an important component to maintaining a competent and committed staff. Partnerships with industry and universities have long been needed for the labs and DOE to meet their responsibilities. But partnerships with industry and academia allow the laboratories to maintain staff expertise in areas necessary to national security but perhaps not adequately funded. One example of this at Sandia is in the area of parachute technology, where our partnerships with the textile industry and with automobile airbag manufacturers maintain our R&D capability for a critical future stockpile need.

5/1/95

STRATEGIC LIFT

HOUSE OF REPRESENTATIVES,
COMMITTEE ON NATIONAL SECURITY,
MILITARY PROCUREMENT SUBCOMMITTEE,
Washington, DC, Thursday, March 30, 1995.

The subcommittee met, pursuant to call, at 9:30 a.m., in room 2118, Rayburn House Office Building, Hon. Duncan Hunter (chairman of the committee) presiding.

STATEMENT OF HON. DUNCAN HUNTER, A REPRESENTATIVE FROM CALIFORNIA, CHAIRMAN, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. HUNTER. The subcommittee will come to order.

Let me first apologize for starting late, 30 minutes late. We had a vote on the Mexican bailout in the Republican conference this morning; whether we are going to have a vote on the floor. The bad news is we are going to use all of our lift money to bailout Mexico. No, not really; just most of it.

Today, we continue our review of the DOD budget request for fiscal year 1996 as we examine the all important topic of strategic lift. A year ago, Gen. Joseph Hoar, then-commander in chief of the U.S. Central Command told the Congress, "Strategic lift in the country is broken right now."

He noted the shortage of long-range military cargo planes and fast cargo ships is so severe that U.S. Forces would be hard pressed to fight even one major regional contingency. Last week, we heard from several retired four-star officers; among them, a former Marine Corps Commandant and a former Chief of Naval Operations that strategic lift is one of the two most serious deficiencies facing the Department that could impair a major military operation.

They went on to state that in both strategic airlift and sealift, the Department's current capacity is significantly below that required to execute the Bottom-Up Review's two MRC strategies. In fact, they echo General Hoar's views that our current lift capacity might be hard pressed to meet the time lines of a single major regional contingency [MRC].

Finally, they noted that proposed efforts to overcome existing deficiencies fall well short of what is needed, in as much as strategic lift is a cornerstone of being able to fight and win two nearly simultaneous MRC's.

These are both serious and worrisome findings. In order to put these concerns in perspective, however, the subcommittee needs to understand whether or not the department's new Mobility Requirement Study Bottom-Up Review Update, known to some as MRS

BURU in Pentagon parlance, affirms the requirements of the original 1992 MRS or if these requirements have changed.

Perhaps the former four-star's judgment was based on out of date information. Unfortunately, Secretary Perry has not finished his review of his second Bottom-Up Review. Consequently, we are unable to get a Department witness to come brief us this morning on the study's findings.

However, we have seen the draft report. We believe that we should be able to discuss its assumptions, analysis, and conclusions without an official DOD briefing. As well, we will hear from the Commander in Chief, U.S. Transportation Command on the posture of our current mobility forces to carry out the mobility requirement study-bottom up review update [MRS–BURU] requirements, and on his view of any existing or projected shortfall in these forces.

Finally, we will review the Department's modernization plan for its mobility forces with Air Force, Navy, and industry witnesses.

Joining us this morning are Gen. Robert L. Rutherford, commander in chief, U.S. Transportation Command. General, thank you for being with us this morning. Lt. Gen. Richard E. Hawley, Principal Deputy Assistant Secretary of the Air Force for Acquisition, welcome. Vice Adm. Philip M. Quast, commander, Military Sealift Command. Richard H. Vortmann, president and CEO, National Steel and Shipbuilding Co.; James W. Evatt, vice president, business development, Boeing Defense and Space Group; Don Kozlowski, vice president and program manager, C–17 Aircraft Program, McDonnell Douglas Corp.

We welcome you all today. We are pleased that you could be with us for this very important hearing. On an administrative note, we will receive the statements of all of our witnesses prior to beginning our questions.

General Rutherford will lead off, followed by General Hawley. Next, we will hear from Mr. Evatt and Mr. Kozlowski. Finally, Admiral Quast and Mr. Vortmann will make their presentations.

Before we begin, let me call on the subcommittee's distinguished ranking Democrat, the gentleman from Missouri, Mr. Skelton, for any opening comments he might have.

STATEMENT OF HON. IKE SKELTON, A REPRESENTATIVE FROM MISSOURI, RANKING MINORITY MEMBER, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. SKELTON. Thank you. I compliment the chairman for calling for this hearing. It is unfortunate we can't get the bottom line, as you suggested, with administration witnesses, but we look forward to the testimony today. I think that if we have an achilles heel it is in the lift potential or lack thereof for the Bottom-Up Review's 2 MRC's.

We look forward to the testimony today. Thank you, sir.

Mr. HUNTER. I thank the distinguished ranking member. General Rutherford, the floor is yours.

STATEMENT OF GEN. ROBERT L. RUTHERFORD, U.S. AIR FORCE, COMMANDER IN CHIEF, U.S. TRANSPORTATION COMMAND.

General RUTHERFORD. Thank you, Mr. Chairman.

Mr. Chairman and distinguished members of the committee, it is my pleasure to appear before you today to address the defense transportation system.

While our military force structure is sinking, our global involvement has expanded. Now, more than ever the United States is dependent upon strategic mobility to protect America's interests.

The men and women of the U.S. Transportation Command eagerly accept the challenge of maintaining a defense transportation system ready and capable of meeting our Nation's needs. Our people, the 118,000 dedicated men and women of U.S. Transportation Command [USTRANSCOM], are the foundation of our readiness and war fighting capability.

We are fortunate to be blessed with the brightest, most dedicated force I have seen in my 33 years of service. In this turbulent time of reduced defense budgets, we must remain sensitive to their needs. Adequate pay, quality medical care, housing, and family support programs must be funded if we are to maintain a quality force.

Modernization of the air mobility fleet is USTRANSCOM's number one equipment priority. Our current workhorse, the C–151 Starlifter, is reaching the end of its useful life. While this aircraft is currently flying without restriction, the fleet averages 37,000 flying hours and its age is starting to show. We are working to hold down C–141 flying hours until its programmed phase-out in 2006.

The Defense Acquisition Board has placed the C–17 in a provisional status until November 1995. During this probationary period, McDonnell Douglas has made significant progress in getting the program on track.

Deliveries are ahead of schedule and quality is excellent. As planned, and with all conditions met, on January 17, 1995, I declared initial operational capability for the C–17. We are currently operating 14 aircraft at Charleston AFB.

While crew training continues as we build to the currently approved 40 aircraft fleet, we have begun to use the C–17 on regularly scheduled airlift missions to meet our customers' needs.

I believe it significant to note that the National Aeronautics Association has recently awarded the C–17 the Collier Trophy, symbolizing the top aeronautical achievement in 1994.

In addition to the modernization of the airlift fleet, we must stay the course and complete the recommended enhancements to achieve 10 million square feet of surge sealift capability. Today, we have approximately 6.5 million square feet of capacity in our organic fleet, and of this, only 5 million square feet is currently available in time to meet surge lift requirements.

To overcome this shortfall, we must have begun the process to acquire 11 large medium speed roll-on/roll-off ships and 7 additional Ready Reserve Force roll-on/roll-off ships. Acquisition is only part of the story however, we must have the required operations and maintenance funding to maintain these ships in adequate status.

This past year $250 million was requested in the President's budget for this purpose while only $150 million was made available. As a result, many of our ships had to be placed in reduced operational status.

Additionally, we need to complete the procurement of eight large medium speed roll-on/roll-off ships for afloat pre-positioning. This will release seven ships back to the Ready Reserve Force and fulfill the requirement for 10 million square feet of surge sealift capability.

In summary, this Nation needs to modernize its strategic mobility forces. In airlift, we must get on with replacing the C–141. In sealift, we must continue the large medium speed roll-on/roll-off and Ready Reserve Force acquisition programs and we must make available sufficient resources to maintain our fleet in a prudent state of readiness.

With your continued support, I believe we can have confidence in the future readiness of the defense transportation system. Thank you, Mr. Chairman.

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Posture Statement

General Robert L. Rutherford, USAF
Commander in Chief
United States Transportation Command

Before the 104th Congress
House Committee on National Security
30 March 1995

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House Committee on National Security

Mr Chairman and members of the Committee:

Since the fall of the Berlin Wall America's role in the world has changed significantly. The U.S. military has been involved across a wide spectrum of missions: from the war in the Persian Gulf to our most recent experience in Operations SUPPORT HOPE (Rwanda), UPHOLD DEMOCRACY (Haiti), SAPPHIRE (the recent airlift of highly enriched uranium from Kazakhstan to the United States in support of U.S. government non proliferation efforts), and SAFE PASSAGE (return of Cuban migrants to Guantanamo Bay). While our military force structure is shrinking, our global involvement has expanded. Our nation's leadership clearly recognizes that the United States is more dependent than ever on strategic mobility to protect America's interests. The United States Transportation Command (USTRANSCOM) and our Transportation Component Commands (TCCs) -- Military Traffic Management Command (MTMC), Military Sealift Command (MSC) and Air Mobility Command (AMC) -- are responsible for maintaining a Defense Transportation System (DTS) ready and capable of meeting the Nation's needs.

The men and women of USTRANSCOM, Active, Guard, Reserve, and Civilian, together with their partners in the commercial transportation industry, eagerly accept this challenge. On their behalf I'd like to present the USCINCTRANS Annual Report to Congress. It outlines our vision, provides our view of the DTS role in supporting National Security Strategy, assesses the health of the DTS, and highlights our near and long-term efforts to correct the shortfalls in our nation's defense transportation capability.

The performance of the DTS had been hampered by fragmentation along Service and modal lines. The creation of USTRANSCOM eight years ago was a major step toward repairing this fragmentation. Three years ago the Secretary of Defense assigned USTRANSCOM combatant command over common-user transportation resources and designated USTRANSCOM as the single manager for defense transportation in peace and war. This action properly aligned authority with responsibility, and is now paying off.

As a result of this realignment, USTRANSCOM undertook a study to determine the future path for the DTS. We've completed this study and established our vision. The DTS 2010 Action Plan, as it is called, has seven major end state objectives:

- Empowered DTS agents to service customers at the point of origin.
- A Joint Mobility Control Group that integrates common-user traffic management to include both organic and commercial lift.
- A seamless, or transparent, hand off of information, passengers, and cargo at the theater port of debarkation or staging area to the theater commander.
- A global information system that integrates traffic management processes and data bases in peace and war.
- A single, integrated financial management system for DTS common-user transportation assets and operations.
- A single, integrated procurement system for USTRANSCOM.

- A joint transportation technology focal point for transportation engineering and the development and application of transportation technologies.

Our goal is to maximize the effectiveness of the DTS and support for our customers. We have begun the process of incorporating these objectives into our long term planning and programming efforts and are on our way toward achieving our vision for the DTS. All of our efforts are focused on ensuring the DTS will meet its responsibilities within the framework of the National Security Strategy.

As DTS 2010 now guides our future business processes, the primary tool for guiding our force structure and modernization efforts has been the 1992 Mobility Requirements Study (MRS). It identified our mobility requirements and recommended ways to improve our airlift, sealift and surface capabilities.

DTS -- The Requirement

The 1994 draft Mobility Requirements Study Bottom-Up Review Update (MRS BURU) revised and updated the strategic mobility requirements for the next century. It validates the sealift recommendations of the original MRS and revises the requirement for airlift. Achieving these recommendations is essential to our ability to meet our strategic lift requirements.

Our ability to meet the MRS BURU requirements of dual, nearly simultaneous, major regional conflicts (MRC) is a function of assumptions, force requirements, and delivery timelines. It

should be remembered that MRS BURU is a planning tool helping to guide the debate on the kind and amounts of strategic mobility assets our nation should possess at the turn of the century.

The MRS BURU scenario depicts a MRC closely followed by a second MRC where the enemies' attacks are stopped prior to achieving essential objectives. The attacks are stopped by the rapid delivery of halting forces composed of in place, prepositioned, and airlifted forces. In order to stop the enemy and then counterattack, it is essential to rapidly deploy reinforcing units to the theaters. The heavy equipment and supplies for these forces must be moved by sea and the soldiers, Marines and critical and high value material by air. This concept provides the basis for sizing the strategic mobility force--how much and what mix of lift we require to deliver the halting forces, reinforcing units, sustainment supplies, and the overwhelming force required for decisive offensive action.

The assumptions used in the studies, modeling simulations, and ultimately the decisions derived from such work are often not widely understood. Yet it is the assumptions used in our models that can ultimately influence the size and structure of our mobility forces. These assumptions include warning times, Presidential Selected Reserve Call-Up (PSRC), Civil Reserve Air Fleet (CRAF) activation, access to ports, and available enroute infrastructure.

While recognizing the limitations inherent in models and simulations, we must make judgments on the criticality of certain unique military capabilities. The deterrent effects derived from

the possession of a large number of mobility aircraft, which are able to move outsize cargo quickly, or execute a large scale airborne assault is hard to quantify. Yet, there is little doubt that this capability does have a deterrent effect. As we debate the risks associated with future operations, we must also remember that we are structuring the strategic mobility force for the next century. That force must retain the flexibility to meet yet unforeseen threats to our Nation's interests.

USCINCTRANS Assessment of DTS

Today's DTS is ready to support the warfighting CINCs' warplans assigned by the Joint Strategic Capabilities Plan (JSCP) and the requirements outlined by the NCA. Maintaining this readiness is USTRANSCOM's top priority. I want to share with you my concerns about the continuous high operations and personnel tempo (OPTEMPO, PERSTEMPO) and the need to maintain the high priority of DoD strategic mobility modernization programs.

OPTEMPO

Today's high OPTEMPO is particularly challenging to our active duty forces. Two-thirds of our lift capability is in the Reserve components and commercial sector. We have limited access to these resources during peacetime. The Air Mobility Command is acutely aware of this problem. The temporary duty (TDY) burden required by this high OPTEMPO is highlighted by operations in Somalia, Rwanda, Kenya, Haiti, Panama, as well as support for

disaster relief efforts. Current operations deployments, along with routine permanent change of station travel and individual training, cause extensive duty away from home for AMC personnel. Tanker Airlift Control Element (TALCE) and Aerial Port personnel averaged over 154 and 175 days TDY, respectively, last year. We have set a goal of no more than 120 days TDY per year for all air and ground personnel supporting air mobility operations. Our efforts to limit the deployed days for aircrews have been relatively successful, but require intensive management.

Since the fall of the Berlin Wall, the number of potential worldwide crises points has doubled to nearly 70. USTRANSCOM must respond quickly in support of U.S. objectives in these areas delivering forces when and where needed. Therefore, the command must focus its attention on the entire world and the full spectrum of support from humanitarian operations to contingencies.

The people and equipment of USTRANSCOM have had little rest since Operation JUST CAUSE (Panama) in 1989. The continued support of peacekeeping activities, humanitarian missions, ongoing contingencies, and Joint Chiefs of Staff (JCS) exercises have strained resources. There is a point where peacetime OPTEMPO and PERSTEMPO will begin to impact on USTRANSCOM'S ability to support an MRC.

To reduce the OPTEMPO we must efficiently utilize our organic transportation resources while leveraging commercial industry capabilities. We support a strong U.S. commercial transportation industry. We want to maintain access to

commercial lift during this period of Department of Defense (DoD) and commercial downsizing and restructuring. In the past DoD relied on the excess capacity in the commercial transportation industry to move our forces and materiel during a crisis. To survive in today's competitive environment, commercial operators are eliminating excess capacity. This impacts how DoD conducts business with our partners in the transportation industry. To ensure access to commercial transportation during a contingency, we are working to channel the government's transportation business to those commercial operators committing their assets to support operations in peace and war.

Quality of Life

The foundation of our readiness and warfighting capability is our people -- the 118,000 dedicated men and women of USTRANSCOM who provide a responsive DTS for America everyday. We are blessed with the brightest, most dedicated force I've seen in 33 years of service. In this period of reduced defense budgets, we must remain sensitive to our people's needs--to ensure every member of every branch of Service is treated like a true professional.

My primary quality of life (QOL) concern is attractive compensation levels to support our more frequently used, smaller force. The combined direct (pay/allowances) and indirect (housing, health, other installation support) benefits must compensate for the high PERSTEMPO.

To attract and retain an all volunteer force, we need to provide pay and benefits that are competitive with the civilian sector. The actual and perceived erosion of benefits experienced during the 1970's taught us piecemeal budgetary "savings" are outweighed by the devastating impact on retention and readiness. From attractive pay, to quality medical care, a stable inflation protected retirement program, housing, and family support programs ... we must ensure we continue to adequately fund these QOL Programs through the Future Years Defense Plan (FYDP).

Reserve Force Access

Another area of concern is early access to Reserve forces. These forces augment our active duty forces daily and provide more than 50 percent of our military capability during a mobilization. We require early and assured access to large numbers of Reserve forces to support immediate crises response and to "prime the transportation pipeline." Approximately 10,500 Reservists are required to support strategic mobility--to put in place the infrastructure required to prepare units for movement, to open seaports of embarkation (SPOEs), to provide aircrews, aerial port, and maintenance support for CONUS aerial ports of embarkation (APOEs) and OCONUS en route support. Over 55 percent of our strategic airlift crews, 45 percent of our air refueling crews and 66 percent of aerial port personnel are in the air reserve component. The preponderance of the Navy's Cargo Handling and Port Groups are also within the Reserves. Approximately 88 percent of MSC's military shore support and most

of MTMC's Transportation Terminal Brigades/Battalions, Deployment Support Brigades, Port Security Companies, and Railway Operating Battalion are in the Reserves.

The context of involuntary recall is changing from rare and massive to frequent and tailored. During operation UPHOLD DEMOCRACY (Haiti), a limited Presidential Selected Reserve Call-Up (PSRC) of 5,700 was authorized emphasizing the use of volunteers. Unless a major contingency triggers some level of mobilization, "volunteerism" is the current methodology for responding to crises before resorting to involuntary call-up. This creates a reliance on troops and skills that may not match the scenario. Availability and tailoring of the "right skills" is essential to USTRANSCOM getting the job done. We continue to work with the Assistant Secretary of Defense for Reserve Affairs in exploring alternate methods to ensure reserve forces are available to meet our mobility requirements.

Air Mobility

Our current capability is approximately 49 MTM/D. The 49 MTM/D is achieved through full mobilization. This includes all Air Reserve Component (ARC) and Civil Reserve Air Fleet (CRAF) assets. Active duty forces, augmented with 25 percent ARC volunteers, provide a daily peacetime airlift capability of 18 MTM/D, the capability to support an airlift operation like VIGILANT WARRIOR (Saudi Arabia/Kuwait) without activating the reserves. The fully mobilized military airlift fleet provides 31 MTM/D with the remaining 18 MTM/D coming from CRAF.

Modernization of the air mobility fleet is USTRANSCOM's number 1 equipment priority. Without a robust and long-term commitment to modernization, our air mobility forces will become the weak link in the DTS. To sustain and improve our use of non-lethal air power as the "first weapon of choice," we should make a definitive decision on the modernization of the airlift fleet this year.

We have stated the problem before. Our current workhorse, the C-141 Starlifter, is rapidly reaching the end of its "life." We rely on its capabilities to meet current DoD requirements. The C-141 weep hole situation clearly demonstrated the potential for the next inspection to identify a problem that could permanently ground or drastically restrict our aging Starlifter fleet. We have attempted to reduce flying hours and extend its life; however, day-to-day mission taskings remain high and its retirement is quickly approaching.

Beyond the issue of a tired airframe, Army and Marine Corps modernization efforts limit the effectiveness of the C-141. Combat systems (M-1 tank, Multiple Launch Rocket System, Patriot missile launcher) have grown bigger and heavier. Today's outsize equipment will not fit into the C-141. As a result we are putting additional resources into our other primary airlifter, the C-5 Galaxy, to improve its reliability and increase mission capable rates. The C-5 is limited by its 1960's technology in avionics, engines, instrumentation and flight controls, all expensive to maintain. We have achieved some success in raising the C-5 mission capable rates. However, it is expensive to

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upgrade the dated technology. Also, we have reached the limit on modifying and utilizing the cargo carrying capability of our tanker fleet to reduce the demands on our airlifter fleet. To enhance our global operations, we must continue to ensure the availability of the KC-135 for both air refueling and airlift support.

The C-17 Decision

The 1993 Defense Acquisition Board (DAB) review placed the C-17 in a provisional status until November of this year. During this probationary period, it appears McDonnell Douglas has made significant improvements to get the program back on track. Deliveries are ahead of schedule and show dramatic improvements in quality. During developmental testing, the aircraft showed it is well on its way toward meeting our demanding requirements.

As planned, and with all conditions met, on 17 January 1995, I declared initial operational capability (IOC) for the C-17. We are currently operating 14 aircraft at Charleston AFB.

The next major test is the 30-day Reliability, Maintainability, and Availability (RM&A) evaluation this summer. We are committed to a vigorous RM&A evaluation to ensure the C-17 meets the nation's needs and will serve as a reliable replacement for the C-141. The results of this evaluation will aid our decision in November 1995 at the Milestone IIIB DAB. Our preliminary evaluation has shown the program on track for this summer's events.

In preparation for the November decision, AMC is participating in the Strategic Airlift Force Mix Analysis (SAFMA), an evaluation of several combinations of C-17s and/or nondevelopmental aircraft to determine the most cost effective force to meet our military requirements. SAFMA utilizes the same assumptions as MRS BURU to assess air mobility capability to meet requirements in support of the National Security Strategy. SAFMA results will be integral to the C-17 decision and determining the number of Nondevelopmental Airlift Aircraft (NDAA) in source selection.

The NDAA, in the form of a wide-body commercial derivative or other military aircraft, can potentially be procured to augment the C-17. Although the NDAA offers the potential for a less costly option for general airlift, the design of commercial aircraft prevents them from fully meeting the nation's militarily unique air mobility requirements. Therefore, as USCINCTRANS, I must emphasize, while I fully support the analytical efforts of MRS BURU and SAFMA to quantify the most cost effective solution to the airlift force mix, we cannot forget the flexibility afforded this nation by those unique military characteristics only certain aircraft provide. Air refueling, austere field operations, limited ramp space operations, and airdrop ... are capabilities that will prove critical in military operations of the future just as they have in the past.

Materials Handling Equipment

An airlift system is only as capable as the materials handling equipment (MHE) supporting it. The backbone of our current MHE fleet is the 40K loader. It is increasingly unreliable due to age and condition. The present inventory fills only 77 percent of that required to meet Defense plans. In addition to the 40K loader, wide-body elevator loaders (WBELs) are necessary for reaching the high cargo floors on commercial wide-body cargo aircraft and our KC-10s. The current inventory of WBELs is limited.

The prognosis for the MHE is good--but funding must remain intact. The new 60K loader is our second highest air mobility acquisition priority. It is slated to replace the 40K loader and many of the WBELs. The 60K loader, which can be airlifted by C-141s, C-5s, and C-17s, will meet MHE requirements for the 21st Century. The 60K production contract was awarded in April 1994. The acquisition strategy requires two 5-year buys to meet the requirement of 318 loaders.

Airlift Defensive Systems

Protecting airlifters from the infrared (IR), surface-to-air missile(SAM) threat is essential to performing our global mission while minimizing risks to crew and aircraft. The proliferation of these mobile IR SAMs makes airfields susceptible to terrorist threat or enemy activities. The initial effort to protect airlifters was a program called SNOWSTORM. It provided defensive

capability against IR guided threats to 18 C-130s, 13 C-141s, and 4 C-5s and a prototype for the larger Airlift Defensive System (ADS) program. The current ADS program includes missile warning and countermeasure dispensing systems for 83 C-141s, 28 C-5s, and up to 120 C-17s.

Global Positioning System

A Global Positioning System (GPS) modification will provide our air mobility fleet with a more precise, worldwide navigation capability. Our goal, in complying with Congressional guidance, is to provide aircrews the best GPS system integrated into other cockpit modernization efforts by the end of fiscal year 2000. Our plan is to integrate installations with inertial navigation, communications, and flight instrumentation systems to complement the overall cockpit modernization process.

Flight Simulators

The assured readiness of our airlift and tanker crew force requires high quality flight and simulator training. The increased use of high fidelity flight simulators, similar to those used by the commercial sector, will provide a cost effective training system reducing the demands on our aircraft fleet. Acquiring these systems requires a commercial off-the-shelf hardware and software upgrade to our existing simulators. This avoids an expensive research and development program. This upgrade will allow us to transfer proficiency training requirements from the aircraft to the simulator with no reduction

of aircrew readiness. These simulators will result in direct savings, increase the operational availability of airlift and tanker fleets and extend their useful service life.

Civil Reserve Air Fleet

A critical piece of our strategic airlift capability is the CRAF program. For our most demanding scenarios, commercial air carriers will provide over 90 percent of our long-range passenger capability and more than 30 percent of our long-range cargo capability. Commercial carriers volunteer to participate in the program in exchange for access to government airlift business. Congress has supported this program in the past, and I ask your continued support.

Current commitments to the CRAF program meet DoD cargo requirements, and based upon draft MRS BURU analysis, approximate total passenger augmentation needs. However, a significant shortfall remains in the aeromedical airlift segment. Currently, only 46 percent of the B-767 aircraft needed for aeromedical airlift requirements are enrolled in the program. This year we will focus on closing the gap by attracting more aircraft into the program and by modifying aeromedical configuration kits so they can be used on other types of aircraft.

To sustain and stimulate the CRAF program, we must work both current and new initiatives. We expanded the CRAF business base by approximately $1 billion by working with the General Services Administration (GSA) to link award of the GSA city-pair contract to CRAF participation. This addressed concerns raised by

scheduled passenger carriers and induced two major carriers to return to the CRAF program after a one-year absence. We also plan to work with GSA to link their award of GSA small package contracts (several of which will be up for renewal in FY96) to CRAF participation.

The Federal Acquisition Streamlining Act allows DoD to open its military airfields to commercial carriers participating in CRAF. This, coupled with access to military airfields as weather alternates, will provide direct economic benefits to our CRAF partners.

Sealift

Large Medium Speed Roll-On/Roll-Off Ships (LMSR) Acquisition and Conversion

Today we have approximately 6.5 million square feet of capacity in our organic fleet--MSC's Fast Sealift Ships (FSS) and the Maritime Administration's (MARAD) Ready Reserve Force (RRF)--of which 5 million square feet is currently available in time to meet surge lift requirements. To meet the total MRS surge requirement of 10 million square feet of capacity, we plan to acquire the recommended 11 surge LMSRs and 7 additional RRF Roll-On/Roll-Off (RO/RO) ships and restore the readiness of selected RRF ships currently in reduced readiness. Additionally, 8 LMSRs are planned for acquisition for prepositioning. Critical to the whole concept of 10 million square feet of surge capability is

continued adequate operations and maintenance (O&M) for our organic surge vessels.

The acquisition strategy for the 19 LMSRs is conversion of 5 existing ships and new construction of the remaining 14. Currently, three ships are being converted at the National Steel and Shipbuilding Company (NASSCO) in California, and two ships are being converted at the Newport News Shipbuilding and Dry-dock Company in Virginia. Estimated delivery for the lead ship from both the NASSCO and Newport News yards is December 1995. Avondale Industries, Inc. in Louisiana and NASSCO were awarded contracts in September 1993 for the design and construction of new LMSRs. The contract with each shipyard was for one ship with options for up to five additional ships, for a total of 12 new construction LMSRs. New construction LMSRs under contract now total six. The acquisition strategy for the remaining two LMSRs has not yet been determined, but we anticipate contract award in FY99. We need your continued support to keep this program on schedule.

Ready Reserve Force (RRF)

The RRF is a critical component of our sealift fleet, comprising 40 percent of our total organic capability. It provides over one-half of the total sealift capability necessary to deploy the two Army heavy divisions and Marine Corps amphibious task force assault follow-on echelon forces required to halt an enemy attack and then build-up for the counterattack.

Some question the need to maintain the RRF in the high readiness status established in the original MRS. We reexamined our requirements for this force as part of the MRS BURU effort. The draft MRS BURU validated the requirement to reduce the size and readiness of the RRF in FY01, but only after we complete the LMSR and remaining RRF RO/RO acquisitions and achieve 80 percent containerization. Today, the RRF is the most cost effective source of surge sealift, and coupled with our eight FSSs, represents our only source of organic surge sealift capability.

In FY95, RRF O&M funding was reduced by $100 million from the President's Budget. This forced us to make significant changes in force size, maintenance, and readiness status in order to focus limited funds on our most capable and critical ships. Specifically, while maintaining our RO/RO ships at 4-day readiness, we reduced the readiness and maintenance on 29 vessels, placed 29 vessels in a minimal-maintenance 30-day readiness status, and transferred 13 vessels to the National Defense Reserve Fleet.

Although $43 million was appropriated to DoD in FY95 for RRF RO/RO acquisition, $158 million previously appropriated to MARAD in FY94 was rescinded. As a result, instead of completing acquisition of all seven additional RO/RO's required by MRS analysis, we will only acquire one to two ships.

The shortfall in RRF O&M and acquisition funds have the potential to derail our sealift program. Specifically, if these funding trends continue, we will fall short of our 10 million square feet of organic surge sealift capacity goal by 1 million

square feet (the capacity necessary to move approximately two combat brigades) and realize lower overall force readiness in FY01 and beyond.

Reductions in RRF funding have pushed MARAD to propose a number of new steps to improve the program and maintain the necessary 10 million square feet of organic surge capacity. In particular, we believe it appropriate to shift funding responsibility for the program from DOT to DoD. This shift, especially in light of strategic lift's high-priority in our overall defense program, ensures RRF funding can be appropriately and sufficiently considered by the Congressional committees having oversight of defense related programs.

Second, we must restore and sustain O&M funding through FY00. This will permit us to restore maintenance and readiness levels consistent with MRS BURU recommendations. Furthermore, in addition to the RO/RO ship we plan to acquire this fiscal year, we are requesting the acquisition of 2 RO/ROs in FY96.

Maritime Revitalization

While we pursue the essential modernization of our organic sealift fleet, we have not forgotten the importance of the U.S. maritime industry to our overall sealift capabilities. Just as we did in the Gulf War, Somalia and most recently, back to the Persian Gulf, we rely extensively on our commercial partners to support our worldwide commitments. In peacetime we ship over 16 million tons of DoD cargo using privately owned U.S. flag ships manned by U.S. mariners, spending over $1.7 billion annually

within the maritime industry. In wartime we depend upon the U.S. merchant fleet to support the flow of sustainment and ammunition cargoes and to provide the mariners necessary to man our organic ships.

To ensure continued availability of this critical capability, we support the proposal for a Maritime Security Program (MSP) funded by DOT which furthers national economic and security objectives. We will be working closely with DoD and the MARAD to ensure that military sealift requirements are met at best value to the American taxpayer. We must emphasize that the MSP is not a substitute for the unique RO/RO military capabilities of DoD's programs which are specifically designed for rapid deployment of the full range of military equipment.

Merchant Marine Reemployment Rights

Increased productivity of modern containerships has resulted in shrinking numbers of qualified seafarers in the commercial seagoing industry. In the worse case scenario, when trying to crew DoD surge sealift ships rapidly in a crisis this reduced availability of U.S. merchant mariners could delay the availability of surge sealift. However, additional study is required to quantify the availability of mariners from the inland waterways, Great Lakes, domestic offshore industries, and other sources before an accurate assessment of any potential shortfall is known. One initiative to help maximize the number of crews available in a war or other national emergency would be a legislative provision extending reemployment rights for certain

merchant seaman employed in shore-based industries but holding active U.S. Coast Guard certificates and licenses to serve aboard activated surge sealift assets. These mariners represent a large pool of labor that was willing to volunteer during the Persian Gulf War, but could not due to lack of reemployment rights. This provision would be similar to the reemployment rights guaranteed for reserve military personnel. Several bills were introduced during the last Congress which included such a provision, but none passed. Such a measure is necessary and prudent to improve the availability of merchant seaman during a time of crisis.

Afloat Prepositioning Force (APF)

Prepositioning of equipment afloat is key to our flexibility in responding to contingencies in widely separated theaters. Currently, we preposition afloat Army and Marine Corps combat forces, and general equipment, supplies, and ammunition of all the Services.

Central to the effectiveness of the APF is the acquisition of the vessels designed to carry the Army brigade and support package. Both MRS and MRS BURU validated the requirement for LMSRs with a total capacity of two million square feet to support prepositioning and early closure of the Army brigade. Based on this, our APF will increase by eight LMSRs, one heavy lift prepositioned ship and two container ships to support an Army heavy brigade (afloat) with 30 days of sustainment. These prepositioning LMSRs are currently under conversion or construction with all scheduled for delivery by FY01. To ensure

the current readiness of our APF, since the first LMSR will not be delivered until late FY95, interim afloat prepositioning capability is being met using seven RO/RO ships from the RRF. Prepositioning will also be enhanced with the addition of one ship to a Maritime Prepositioning Squadron. Funding for this ship was provided for in the FY95 budget.

Surface

As previously stated, much of the commercial transportation surge capability that existed is being trimmed through restructuring. The commercial transportation industry has become more efficient and divested itself of excess capacity.

For example, rail is much more efficient today. Railroads have 700,000 fewer rail cars, 550,000 fewer employees and 10,000 fewer locomotives than in 1960. The commercial rail industry cannot provide sufficient heavy lift flatcars to meet current Army Strategic Mobility Program (ASMP) time lines. The importance of these rail cars was highlighted during DESERT STORM when the average wait for access to commercial rail cars was 5-7 days. This situation, along with the limited number of commercially available heavy lift flatcars, has forced the Army to initiate a program to procure flatcars and position them at installations to meet early deploying time lines. The Army budgeted $11.8 million in FY96 for rail car procurement. The need for this program was revalidated during UPHOLD DEMOCRACY (Haiti) where we again experienced as much as a 7 day response time for access to commercial rail cars.

The deregulation of the 1980s has compelled structural changes in the railroad and trucking industries. As entry barriers dropped, more carriers have entered the trucking industry while forcing many inefficient companies out of business. Railroads have cut costs and gains in efficiency have added pressure on the trucking industry as more companies gained access to intrastate/interstate markets.

In addition to the rightsizing of the industry, trucking firms, railroads, and steamship companies are entering into intermodal and long term partnerships with vendors/shippers to respond to the needs of the marketplace and provide better overall service. More domestic freight is being carried intermodally as truckers use more rail piggyback for long hauls. Intermodalism and information technology have expanded service and blurred the lines between markets. Intermodal traffic is the fastest growing area of the transportation industry and USTRANSCOM is committed to ensuring we take advantage of it.

Joint Container Exercise Program

The goal of the Joint Container Exercise Program is to improve the readiness and responsiveness of DoD to deploy, sustain, employ, and redeploy forces using the intermodal transportation systems. It provides an opportunity to stress in place infrastructure which supports modern transportation systems. Exercises such as TEAM SPIRIT 93 (Korea) and TURBO CADS 94 (Containerized Ammunition Distribution System),

have demonstrated the effectiveness of containerization, intransit visibility (ITV) and intermodalism.

Future exercises are designed to build upon these successes. Our goal is to promote an effective and efficient intermodal container transportation system by increasing DoD's use of intermodal systems, ensuring interoperability between DoD and commercial systems, and maximizing use of intermodal assets and infrastructure.

Rail Car Requirements

Based on the MRS and the ASMP, there is a requirement for 2,027 rail cars to support the movement of equipment for the Army and Marine Corps. This total includes 397 heavy lift cars prepositioned at Army and Marine installations to support the early deployment of lead brigades until commercial rail cars become available on or about day 7. Sufficient heavy lift rail cars are available to move all of the M-1 tanks assigned to these early deploying units. We currently have 718 rail cars on hand with 53 new rail cars under contract and project buying 241 in FY95 and 238 in FY96.

Infrastructure

Base Realignment and Closure (BRAC) actions, deteriorating facilities at existing bases, and lack of funding for infrastructure upgrades also concern me. From my perspective as USCINCTRANS, mission requirements must be the driver behind downsizing. As DoD downsizes, it is reducing its infrastructure

and capacity to deploy, support, and sustain forces. The remaining capacity must be managed to make it more efficient to ensure the right things move to the right places at the right times. With fewer military bases and depots, the remaining bases must be world class launching platforms from which we can project and sustain power.

USTRANSCOM is involved with studying the effects on en route infrastructure due to closure of overseas bases and development of our Global Reach Laydown packages. We are involved with the BRAC 95 process to ensure our stateside transportation infrastructure is correctly identified, protected, and enhanced to meet the deployment needs of our CONUS based forces. Other initiatives are the West Coast Ammunition Port, Joint Logistics Over The Shore (JLOTS), and programs funded through the Mobility Enhancement Fund.

En Route Infrastructure

Since December 1992 we have reduced air mobility en route infrastructure from 39 locations outside the U.S. to 13 key locations (6 PACOM, 6 EUCOM and 1 SOUTHCOM). We are working an ongoing effort with the warfighting CINCs and the Joint Staff to validate key en route infrastructure requirements which must be considered during downsizing. This is tied to the Joint Requirements Oversight Council (JROC) process through the Overseas Presence, Joint Warfighting Capabilities Assessment Work Group. As an example of the success of these readiness efforts, working with the Joint Staff we have analyzed the requirement for

Spanish facilities from a strategic air mobility perspective in a major contingency. The Joint Staff has incorporated the analysis into the JROC process and is now beginning to query the CINCs on their needs for the Spanish bases to formulate a DoD strategy for future deliberations between U.S. and Spanish officials.

West Coast Containerized Ammunition Port

It is critical to have a containerized ammunition capability on the West Coast to effectively support dual, nearly simultaneous MRCs. Without a West Coast facility, ammunition for an Asian MRC would have to be shipped to Sunny Point, North Carolina, our East Coast ammunition port. This adds 12 days to the transit time due to the East Coast to West Coast sail and Panama Canal transit.

We currently have enhancement projects funded by the Army Strategic Mobility Program (ASMP) underway at Port Hadlock, Washington and Concord Naval Weapons Station, California that will increase our West Coast through-put capability to 720 twenty-foot ammunition containers per day as recommended in the MRS. The project is planned to be completed by FY99.

Joint Logistics Over The Shore (JLOTS)

All of the warfighting CINCs with regional responsibilities have identified JLOTS as a required capability to support their operations and contingency plans (OPLANS and CONPLANS). In fact as recently as Operation UPHOLD DEMOCRACY (Haiti), we were prepared to use JLOTS capabilities had the Haitian military

closed Port au Prince's seaport facility. We did use selected pieces of this capability to increase port capacity -- tugs, cranes, and landing craft.

JLOTS exercises, culminating in OCEAN VENTURE 93 (Onslow Beach, North Carolina), demonstrated low operational proficiency due to lack of training was the foremost JLOTS problem. In response USTRANSCOM has proposed a 5-year JLOTS training plan. USTRANSCOM has advocated one dry cargo and one liquid cargo JLOTS exercise be conducted each year in each CINC area of responsibility. The proposed exercises were approved by the CINCs and incorporated into the Joint Master Training Schedule. The Joint Staff JLOTS Exercise Initiative has allocated to USTRANSCOM $15 million each year through FY01 to pay for JLOTS related Strategic Lift (RRF and airlift) and Port Handling and Inland Transportation (PHIT) costs.

Mobility Enhancement Fund (MEF)

The FY95 MEF is a special $50 million authorization provided by Congress to enhance the readiness of strategic mobility infrastructure. In November 1994 USTRANSCOM submitted a list of projects to the Joint Staff and in December 1994 OSD sent Congress the list of recommended projects. USTRANSCOM's proposal allocated $25 million for military rail repair, $4 million for port and pier improvements, $16 million for runway and ramp maintenance, $1 million to support joint mobilization exercises, and approximately $4 million for other infrastructure

improvements. This fund has provided an outstanding opportunity to quick fix some pressing infrastructure problems.

Command and Control

As our nation moved from the industrial age into the information age, the importance of command and control systems for the DTS increased. The proper management of large scale deployment and sustainment operations increases the capabilities of America's combat forces. Ensuring the right forces arrive at the right location at the right time; integrating air, sea, and surface assets; and enabling commanders to divert shipments while en route are critical capabilities that USTRANSCOM must provide the nation's warfighting CINCs. In the past USTRANSCOM has focused its attention on moving people and cargo. Today, our focus is on moving people, cargo, and information with a stronger sense of synchronization.

Our current systems and processes are marginally adequate to support our mission. However, based on our DTS 2010 vision of truly integrating the nation's DTS, fielding a state-of-the-art, customer focused command and control system will likely be the greatest force multiplier we have to offer the warfighting CINCs.

USTRANSCOM has embarked on a multitude of programs to make this happen. Through our Joint Transportation Corporate Information Management Center we have developed a migration strategy to eliminate or consolidate the large number of legacy and duplicate transportation information systems. We are applying functional, technical, and programmatic criteria

developed by the joint transportation community in our analysis of these systems. The result of our efforts -- a strategy to decrease the number of systems from 120 to about 25 -- has been delivered to the Assistant Deputy Under Secretary of Defense Logistics and Transportation Policy for approval.

Another initiative moving us into the 21st Century is DoD's downward-directed secure successor to the Worldwide Military Command and Control System (WWMCCS) -- the Global Command and Control System (GCCS).

The GCCS is a Joint Staff initiative designated and certified to replace the WWMCCS and the Joint Operation Planning and Execution System (JOPES). GCCS will take advantage of rapidly developing technology to produce a single, modern, joint command, control, communications, and computer system for our warfighters. This single, modern system for controlling and coordinating military operations will give us a significant advantage in moving required forces, cargo, and information to the right place, at the right time, and in the proper quantity. This system will provide the connectivity and a variety of software applications and tools used by the warfighting CINCs. One of the programs in this system for which USTRANSCOM is responsible is the Global Transportation Network (GTN).

Global Transportation Network (GTN)

Intransit Visibility (ITV) is information on the location of deploying units' personnel and equipment, patients and sustainment cargo, and other vital resources while they are in

the DTS. GTN provides this service while tying together transportation data from AMC, MTMC, MSC and other DoD agencies. This information will provide the combatant commanders critical information about the location of personnel and materials throughout the DTS. This will significantly improve the capability of the combatant commander to respond to rapidly changing priorities.

GTN is a software rather than hardware intensive system. In other words instead of becoming obsolete it will be routinely enhanced with software upgrades. Access will be available to any authorized user who has a lap top computer, modem, access to a military or commercial phone line, and is cleared to enter the network. Information from GTN will be available to any registered user from the origination of a movement until delivery in theater. A GTN intransit visibility prototype is on-line now, providing intransit visibility of air and sealift movements from APOEs/SPOEs to APODs/SPODs.

When GCCS and GTN are fully matured, they will provide planning support enabling USTRANSCOM to analyze transportation options, forecast total DoD requirements, determine the best mix of lift modes, and identify potential resource shortfalls.

Joint Intelligence Center, Transportation (JICTRANS)

Our global transportation mission demands global awareness. In 1994 USTRANSCOM established JICTRANS to lead DoD in production of relevant transportation intelligence. Renewed emphasis on

timely, accurate information, reflecting the status of worldwide transportation infrastructure, to include vulnerability to weapons of mass destruction, is necessary to support USTRANSCOM, other warfighting CINCs, and mission planners at all levels. A quick global response capability requires swift and prudent operational decisions supported by quality intelligence services. JICTRANS will provide this service for mobility forces.

Global Patient Movement

USTRANSCOM's Regulating and Command and Control Evacuation System (TRAC2ES) is the product of a 1993 DoD directive tasking USCINCTRANS to consolidate and control the separate processes of medical evacuation and medical regulating under a single unified command. TRAC2ES is a decision support system being developed to integrate worldwide medical regulation and aeromedical evacuation activities. We anticipate initial operational capability by the end of CY97.

Advanced artificial intelligence technologies form the core of TRAC2ES' unique, enabling decision support capabilities. Those capabilities include forecasting for operations 2-5 days into the future, as well as reactive replanning for forecasted changes to today's and tomorrow's current operations. The integration of long range planning, short range forecasting, and near-real time decision-making makes TRAC2ES a revolutionary "state of the practice" command and control tool.

TRAC2ES development has been in concert with the Deputy Assistant Secretary of Defense for Information Management and a

Joint Services Corporate Information Management (CIM) Business Process Improvement Team. The success of this developmental effort was highlighted at the National Business Process Reengineering Conference when USTRANSCOM's project received the prestigious Award of Recognition for its significant contributions to improved federal government service and efficiency through the exemplary practice of business process reengineering.

Future capabilities of TRAC2ES will include support for intratheater patient movements (wholly within a theater), the National Disaster Medical System, the Department of Veterans Affairs, and Deployable Medical Regulating Teams which quickly respond to all contingency scenarios.

Defense Transportation Regulation (DTR)

In partnership with our Components, the Services, and the Office of Assistant Deputy Under Secretary of Defense for Transportation Policy, we are developing the Defense Transportation Regulation. We plan to consolidate 38 existing transportation publications into one, comprehensive DTR, derived from DoD Directive 4500.9, Transportation and Traffic Management. This regulation will standardize transportation operations for the movement of passengers, freight, personal property, and units from origin to destination. With the strong support of our Components and the Services, and consistent with the intent of Vice President Gore's National Performance Review , our goal in

drafting the DTR is to reduce the volume of the original regulations by at least 50 percent.

USCINCTRANS Closing Thoughts

Today, USTRANSCOM is ready to successfully conduct the strategic mobility missions assigned by the NCA. For the future I have two concerns -- the cumulative effects of high OPTEMPO on our people and equipment and the need to maintain the high priority of our strategic mobility modernization programs.

There are no simple formulas for prioritizing how we spend our defense dollars. However, the single most important element in the equation is people. We ask our young men and women to make many sacrifices in defense of our nation -- we should be willing to compensate them so they can maintain a reasonable standard of living.

This nation needs to modernize its strategic mobility assets in order to meet the full range of mobility requirements of the warfighting CINCs. **AIRLIFT** . . . we must get on with replacing the C-141. The C-17 may be the right choice. The program is on track and the aircraft is performing well. A decision on the C-17 program and on modernization of the strategic airlift fleet will be made in November 1995. **SEALIFT** . . . we must continue the LMSR and RRF RO/RO acquisition programs plus the appropriation of sufficient resources to maintain our organic fleet in a prudent state of readiness. **SURFACE** . . . we must carry through with acquisition of heavy lift railcars and improve our "fort to port" capability by ensuring the maintenance of our

nation's highways and railways and taking full advantage of intermodal initiatives like the Intermodal Surface Transportation Efficiency Act. **INFRASTRUCTURE** . . . we need a properly sized and modernized defense transportation infrastructure, leveraging the contribution of private/public sector facilities while we maintain emphasis on upgrading our militarily unique facilities identified as Strategic Mobility Enhancement Fund projects.

With emphasis in these areas, continued emphasis on partnership with industry and the internal reengineering of our command and control and business practices, I'm confident we can ensure the future readiness of the Defense Transportation System.

Mr. HUNTER. Thank you, General Rutherford. General Hawley.

STATEMENT OF LT. GEN. RICHARD E. HAWLEY, PRINCIPAL DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE (ACQUISITIONS)

General HAWLEY. Mr. Chairman and members of the committee, thank you for having us here today to discuss what you have already pointed out is one of the Department's top priorities.

It is my understanding that the committee is interested in a review of the very rigorous process that we have in place to work toward a decision this November on the makeup of our future strategic airlift force.

I would be happy to walk through that with the committee if you would like me to.

Mr. HUNTER. Please do.

General HAWLEY. Mr. Chairman and members of the committee, this is a pretty rigorous process that we have established so that the defense acquisition executive can make the right decision for the country this November. There are essentially three parts to this process.

The first described in these top set of bars that I will walk through in a little more detail is to characterize both the performance and the cost of the C–17.

Down here at the bottom with this green bar is a set of actions that will characterize in the same manner the cost in performance of nondevelopmental airlift alternatives.

Those will generate data and solid information that we will input to a set of analysis. It will run that data through a series of models that have been updated since last year.

The principal effort in that will be a strategic airlift force mix analysis which is basically an update to last year's cost and operational effectiveness analysis, which is one of the major inputs to the decision out here that will be made in November.

Let me walk through each piece. Of course, key to the whole thing was the settlement agreement that this body approved last year and which has been absolutely key to getting the C–17 Program back on track and establishing an environment of team work and cooperation between the Government and our primary contractors on the C–17 Program.

During this entire time we have been proceeding with development test and evaluation which is yielding the data to confirm that the airplane, the C–17 aircraft, will perform in accordance with the contract specifications.

We have had, to-date, two readiness reviews. Those were basically dry runs for the major readiness evaluation which will occur in July where we will run through for a month; several thousand sorties to demonstrate that the airplane will perform in accordance with contract specifications.

We achieved initial operational capability [IOC] on schedule in January. General Rutherford declared IOC and we are in the midst of dedicated IOT/E at this time. That will run on out here through the spring and early summer which will demonstrate that the C–17 will perform in an operational environment in accordance with the requirements that our Air Mobility Command has established.

In order to define the cost of the airplane, we have conducted a very rigorous cost analysis.

We have identified those kinds of things that we can do to drive costs out of the airplane and establish a baseline estimate for what we think the airplane can cost so that can be factored into the analysis that will do the cost and operational effectiveness evaluation.

Phase II of that will be the submission of firm fixed price proposals from McDonnell Douglas for lot 8 and beyond, lots 8 through 11 and then options with not to exceed prices for the remainder of the buy should we proceed beyond that point.

On the nondevelopmental airlift aircraft [NDAA] front, we began our effort back here last year. In early 1994, we solicited interest from industry. We did a lot of studies on nondevelopmental aircraft to see how we could load them, how fast they could be turned in an operational environment, what kinds of equipment would fit on them, all of that information has been fed back into the studies that will be done up here.

We have had two draft request for proposals [RFP's] released which we have received industry comment on. We have absorbed that comment, modified the RFPs and we are going to release the final request for proposal this Friday. That will result in firm fixed price proposals from industry for the nondevelopmental airlift alternatives which will be factored back into our analysis up here and allow us to have a good balanced cost in operational effectiveness evaluation of all of the candidates for satisfying the Nation's future airlift needs.

We have got something here labeled MRS BURU which you have already talked about. The Joint Staff has reviewed the mobility requirements, both air and sealift based upon an update of the Bottom-Up Review. That is complete. I expect you will have that in your hand shortly.

It essentially establishes a range of strategic airlift requirement of 49 to 52 million ton miles. That is a much more detailed assessment in terms of how much of that is required to be out-sized, oversized, bulk cargo and so on. It is a little more detailed than the previous information that was used in previous studies.

We talked about the strategic airlift force mix analysis [SAFMA], the cost and operational effectiveness analysis [COEA], a much more rigorous analysis than we had available previously. That will be supplemented by a rate analysis which will validate the ability of all of the aircraft to perform at the level that they have been forecasted in the models, and provide an input in the model to determine how much you can fly these airplanes. What is the utilization rate that you can expect to achieve from each of the alternatives?

Finally, we will have a tactical utility analysis being done by program analysis and evaluation [PA&E] and the Office Secretary of Defense [OSD] staff which will access the tactical utility factors, the military unique factors, if you will, that are required to support the overall airlift requirement. All of this information will come together and result in an informed judgment by the acquisition executive in November as to what is the proper mix. How many C–17's should the Nation buy? Should we or should we not proceed with

a nondevelopmental airlift alternative to complement that buy of C–17's?

That is basically the process. I will be glad to answer any detailed questions. I think you have what we call the chart from hell in front of you, which is a little more detailed explanation of this process.

Mr. HUNTER. General, thank you for your presentation.

I will tell you what we would like to do here. Why don't you stick around, General Rutherford, General Hawley.

We will ask Mr. James Evatt to come forth and Mr. Don Kozlowski. Mr. James Evatt is vice president, business development of Boeing. Mr. Don Kozlowski is vice president manager C–17 Aircraft Program for McDonnell Douglas.

Why don't you gentlemen stay at the table in case we have any cross questions here. We will ask them to tell us a little bit about what they can do.

I think we have had some successful panels this year asking industry to testify with the uniformed services because the industrial base is going to have to supply this lift that we need.

Mr. Evatt, why don't we lead off with you. Tell us about your program and how it is going to work.

STATEMENT OF JAMES W. EVATT, VICE PRESIDENT, BUSINESS DEVELOPMENT, BOEING DEFENSE AND SPACE GROUP

Mr. EVATT. On behalf of the Boeing Co. I want to thank you for the opportunity to speak before you, Mr. Chairman, Mr. Skelton, and the rest of the committee.

If it is OK with you, sir, I would like to just submit our written statement for the record.

Mr. HUNTER. Without objection, all written statements from all witnesses will be accepted into the record. Feel free to just summarize and discuss in any way you want.

Mr. EVATT. If it is OK, I would like to follow General Hawley's example and address a few charts.

Mr. HUNTER. OK. Is that a full-scale picture?

Mr. EVATT. It is a big airplane, sir, and it needs a big chart. Sir, to date the Boeing Co. has built or modified a total of about 132 or 133 747's into the freighter configuration. Other companies have modified 10-plus. Today, there are about 142 747's operating as freighters around the world. That is of a total of about 1,000 747's all total that are in operation or built by the Boeing Co. to date.

The 747–400 that you see here is the latest edition of our efforts to bring a viable commercial freighter to the industry. The 400, to date, is the largest carrier, commercial carrier. It provides about 31 percent of the total fleet service available in the world today. It is a very long-range high payload vehicle. It doesn't necessarily do all of the missions that one might require of a military vehicle.

However, based on our work, as General Hawley said, over the last years with the Air Force, we believe that a substantial portion of what must be moved forward by weight in a crisis situation could be accomplished by a 747 type aircraft or other NDAA candidates.

The circle here on the top left represents our understanding of what was moved and what could have been moved by a 757 class airplane in Desert Storm, Desert Shield.

Mr. HUNTER. So, that's the 80 percent?

Mr. EVATT. About 80 percent by weight could have been moved in that manner in Somalia. Because we probably had less of the heavy equipment that the Army had to move forward, maybe as much as 95 percent by weight could have been moved.

It is our understanding also that in future contingency planning, looking at the two major regional scenario situation, that possibly up to 75 percent of that could be moved by a 747 type aircraft. That aircraft would assume a slightly larger cargo door on the side than we have today and a strengthened floor. If you did not choose to make those modifications to the vehicle, then these percentages would be slightly reduced. As it comes off of the commercial production line today, it doesn't have quite the strength in the floor and the larger cargo would not quite go through the side door.

Sir, we simply put this range payload chart up here to give the committee some impression of the rather significant range in payload capability that the 747 has compared to the current strategic lifters, the C–5, the new C–17 that has just come into service and the 141 that are in service today.

While this range in payload is rather dramatic in comparison, I want to emphasize to the committee that the 747 is a commercial vehicle, not designed to do air drops, not designed to operate in austere fields, and does not have a roll-on/roll-off capability that these other vehicles have to facilitate military operations in some contingencies.

In terms of being able to carry an awful lot of equipment a very long way, the 747 certainly does that and does it very well commercially today.

Mr. HUNTER. While you are up there, why don't you give us an idea of what—you gave a pie chart and the 80 percent. Give us an idea in terms of military equipment what you can carry and what you can't carry.

Mr. EVATT. Sir, we can carry high mobility multi-purpose wheeled vehicles [HMMWV's], the jeeps, the smaller trucks that the Army would have to move, and of course a large amount of palletized equipment in a standard transport configuration. We certainly cannot carry M1A1 tanks, nor would we be able to carry missile defense systems such as the Patriot.

Mr. LONGLEY. Mr. Chairman. How would you load them?

Mr. HUNTER. Yes, go right ahead.

Mr. LONGLEY. You mentioned the vehicles. How would you load them if you don't have the RO/RO capability?

Mr. EVATT. We have a chart back here to show you, sir. Basically, we load those using what they call a 60K or a 60,000 pound loader which you use a scissor system to raise it up to the height of the deck in the 747 and then just drive it on just as you would on a C–5 or something.

Of course, you have to raise it to a considerable height because that's the way the commercial vehicle is designed. It does not have a roll-on. So you can't drive up and just drive it in. You must bring

the vehicle up, put it on the loader, lift it up to the right height, and then enter it into the aircraft.

Mr. LONGELY. So, you have to have the loader on site and you would be loading basically one vehicle at a time?

Mr. EVATT. One vehicle at a time; whatever the loader holds. You do require a loader, yes, sir.

Mr. LONGLEY. At what cost for the loader?

Mr. EVATT. Sir, you would have to ask the Air Force the cost of the loader. I simply don't know.

Mr. HUNTER. Air Force got an answer for that? What do these loaders cost?

General HAWLEY. I think we had better submit that for the record. If I can find it in here I will pull it up for you. I am not sure we have that with us.

[The following information was received for the record:]

60K LOADER

The fiscal year 1996 contract unit price of the 60K aircraft loader is $1,099,548.

Mr. HUNTER. Go right ahead, Mr. Longley. I might say to the members that what we want to do is understand these briefings as we go through.

So, when we have a gentleman at the chart like Mr. Evatt right now the chair will—anyone who wants to ask an understanding question so as to try to understand the briefing, just go right ahead. Hopefully, when the gentleman sits down from his chart briefing here, we will have received most of the messages he sent here, most of his information.

Go right ahead, Mr. Longley, if you want to continue, if you have any other questions, go ahead.

Mr. LONGLEY. I would just interject that as someone who has been involved in the loading of some of these aircraft, I see Colonel Sadler sitting there smiling. I don't know if there are any studies in terms of—maybe this question is directed to the Air Force. I would be interested in a comparison of the loading rates, given the configured military aircraft versus the potential commercial alternative.

Mr. EVATT. That is a part of the effort that we conducted last summer on NDAA in order to characterize the performance and cost of the airplane. A part of that were load studies where we actually took aircraft, did actual loads of them in order so we can better understand how you do that, how much time it takes, how fast you can turn it, and what kind of support equipment is required to do that.

All of that is now a part of the modeling that is going on to support the force mix analysis.

General RUTHERFORD. I might add if I could, we did not test this door configuration that we are talking about. I think you are talking about an expanded door.

Mr. EVATT. We did not last year, no, sir.

General RUTHERFORD. We have not loaded this airplane in this configuration. As a matter of fact, I don't think there is one in this configuration right now.

Mr. EVATT. With the larger door that the Air Force might want as an option, no sir, there is not one like that. I will show you a

chart a little bit later of one of the photos taken during the loading demonstration conducted at McCord Air Force Base last year.

Mr. LONGLEY. I just might submit for the record and for the benefit of the other members of the panel, that it is very clear that you offer some significant range in payload advantages.

By the same token, that has got to be balanced against the military constraints which would obviously deal with issues of turn around time, air field capability in noncommercial environments and that type of thing.

Mr. EVATT. That is absolutely correct, sir. I am sure the Air Force will take that into consideration in their deliberations. I might point out that it is our understanding that about 350 of these 60K loaders as I described earlier are being purchased for support, not only of potential NDAA, but KC–10 aircraft and other things.

I might also point out that with the commercial configuration, it takes a little less than an hour for a single individual using the power loading system to load the aircraft.

I think the experience that the Air Force had last year at McCord was that the actual loading and unloading of the vehicle actually took them a little less time than what they had originally anticipated it might. They would be the best ones to comment on that directly.

Mr. PETERSON. Mr. Chairman, may I?

Mr. HUNTER. Go right ahead, Mr. Peterson.

Mr. PETERSON. I reiterate what you have just said that we are already on a buy on the 60K loader. That is already in the system. It is already purchased over a 5-year period.

The other thing I asked is, in the process of the loading, testing, and mechanism, would there be a requirement to change any of the mobility packaging configuration that the units now have? Does the palletizing or anything else have to be modified to go on a different type aircraft or are you keeping that standardized in order to go to any aircraft that we might either purchase or now have on-hand.

General RUTHERFORD. There is some tailoring that occurs in the Civil Reserve Air Fleet [CRAF] Program right now. For example, a DC–8, we may have to reconfigure the pallet to fit in the DC–8 differently than we could configure it for a 141. I think this airplane that we are talking about would have a big enough body, if you will, that it would not require any major reconfiguration of the pallets, per se.

Mr. PETERSON. From a unit level, is that a constraint as to the equipment that they have to have? Would it be restricted to only certain kinds of units that would have that kind of configuration then?

Mr. EVATT. No. I don't think it would be unit specific. One of the issues you may be getting at is, sometimes when a unit deploys, it will not just have out-sized or over-sized equipment. You would have to mix. You might have a helicopter that you also want to load a HMMWV.

A helicopter being an out-sized piece of equipment and a HMMWV being an over-sized piece of equipment. It is difficult sometimes when we start mixing those terms. Units don't come

that way. They come with equipment. You like to deliver the equipment along with the unit.

Mr. HUNTER. Can you put a HMMWV on this one?

Mr. EVATT. Yes, sir.

Mr. HUNTER. And you have got to do that with a loader?

Mr. EVATT. Yes, sir.

Mr. HUNTER. Mr. Saxton, you had a question, go ahead.

Mr. SAXTON. I just wanted to follow-up on Mr. Longley's question. He used the example of the war we had in the desert. As I recall, the Iraqis came down along the Kuwait border and sat there for awhile. Then they took a next step and came over into Kuwait and for reason they stopped.

This was great for us because it gave us a long period of time to get our goods and our people over there. I guess my question is this. On that pie chart that you had where you projected that you could have carried 80 percent of the stuff that we needed to get there.

How much of that 20 percent that is remaining which I assume is equipment that we would need for the initial mobilization? How much of that initial mobilization is in that 20 percent that you can't carry?

Mr. EVATT. Sir, I can only respond to the numbers that the Secretary of the Air Force and the Chief of Staff gave, I think, in testimony before the Congress a couple of weeks ago. The out-sized and over-sized types take about 70 percent of the early deployments. Beyond what is on the record, I couldn't answer that, sir. The Air Force would have to respond to that.

Mr. SAXTON. So, 70 percent of the 20 percent we need to carry for mobilization purposes on something other than your airplane?

Mr. EVATT. Sir, I would have to defer to General Rutherford for that.

Mr. HUNTER. Go right ahead. The general can answer Mr. Saxton's question.

Mr. SAXTON. If I may just emphasize a point before the general answers. The whole deal in mobilization in terms of our capability of getting there quickly and the safety of our people who are there depend on us having the capability to move the right equipment there very fast.

We didn't have that capability during Desert Shield and Desert Storm to get there fast enough with the equipment to do the job in a safe manner, in my opinion. I think were lucky the Iraqis stopped.

My question is this, if we are going to have a mixed buy of 747's and C–17's, how many C–17's do we need to get that equipment and those people there quickly in order to do the job safely?

General RUTHERFORD. It brings up a good point. Airlift is important to us, very important to us in the initial days of a conflict.

Without pre-positioned forces in a theater of operations, you are left with either prepulling the equipment or forward basing forces to go with that equipment, or flying those people and the equipment that you do not pre-position like helicopters and weapons systems. We just don't have enough of those to preposition those.

So, that equipment needs to be flown in along with the people to marry up with the pre-positioned equipment. Sealift will not get

you there in the first couple of weeks. It is that first 30 days when airlift becomes very, very important to you. As we talked, initially a lot of that movement by air is big pieces of equipment. It is oversized and out-sized cargo, simply because it is high value type cargo in certain ways that cannot or would not be pre-positioned.

Mr. HUNTER. If I may just follow up.

I guess a question that we need to try to get answered is, if we are going to do a buy of 747's and they are capable of carrying 80 percent of what we need for sustainment, as well as mobilization deployment in the Gulf or in a like scenario, we need to know how much of that 20 percent that they can't carry is a part of that initial deployment scenario.

Mr. EVATT. I think the SAFMA analysis that General Hawley referred to is looking at that very thing. We are looking at airplanes. We are looking at pallets. We are looking at loading individual pieces of equipment in this model to determine exactly what it is that we need to do to meet the requirements of the mission.

Mr. DELLUMS. Mr. Chairman.

Mr. HUNTER. Yes.

Mr. DELLUMS. I certainly don't wish to question your wisdom because I think you are absolutely correct in attempting to make sure that we clarify it. In this gentleman's opinion, we are going beyond questions of clarification. I think it is breaking up the integrity of this gentleman's presentation.

My thought is that if we are going to be on the same level playing field, I would suggest that we allow the gentleman to continue to carry out, to complete his presentation, maintain the integrity of it. Then those who are advocates of one perspective or another can get into that.

It seems to me that your initial thought was clarification. We are going beyond clarification at this point. I would hope that we would not continue to interrupt the integrity of the gentleman's presentation.

Mr. HUNTER. OK. I think the gentleman's point is well taken. I still want to allow members to ask question. As we go through this thing, when you have completed, we know what we are doing.

If members can hold down the final argument, but ask clarification questions, let's do that.

Mr. Tiahrt, did you have one?

Mr. TIAHRT. I just was curious about the study that you are doing, what it was called and when is it going to be done.

Mr. HUNTER. Mr. Tiahrt, if you can hold on with General Rutherford. You will have a chance to ask him. What we need to do is ask any questions that are required to get us through the charts.

Does anybody else have any questions on this chart and this aspect of the briefing? Go ahead.

Mr. EVATT. Sir, regrettably, we changed charts on you while you were discussing so we haven't really addressed this one yet.

Mr. ABERCROMBIE. Mr. Chairman?

Mr. HUNTER. Yes, Mr. Abercrombie.

Mr. ABERCROMBIE. Just a procedural question. There may be members more sophisticated in this than I at this stage. I am trying to learn everything I can about this.

Are we certain that all of the things that we are going to discuss right now shouldn't be perhaps in a classified side? Are we going to open this whole thing up? I am hesitant to ask some of the questions I have in mind because I am not sure it is something that shouldn't be under the classified section.

Mr. HUNTER. Let me just advise the gentleman that if you have some classified questions, the best way to get those taken care of is ask for a briefing in your office or contact the individuals here in a private setting and get those answered for you.

Mr. ABERCROMBIE. I prefer to do it with you.

Mr. HUNTER. Sure.

Mr. ABERCROMBIE. Otherwise, I will have to rely on Mr. Sisisky.

Mr. HUNTER. Mr. Sisisky has got all of the answers. But for now, we need to keep the questions open. There are plenty of open questions floating around here.

Mr. ABERCROMBIE. Thank you.

Mr. HUNTER. Proceed, sir.

Mr. EVATT. Thank you, Mr. Chairman.

Sir, it is our understanding that the NDAA would be procured, if that is the Air Force and the Congress' decision, to replace the aging 141. When we are talking about the utility of the 747 vehicle, it is really in response to replacing that vehicle that we understand is in the plan.

In that regard, the kind of materials are size and shape of objects that the 747 can carry I think are pretty consistent with what the 141 carries. So, there is some high degree of commonality there.

Mr. HUNTER. Just before you go, you have got that payload comparison. Put C–17 on there. What does it carry?

Mr. EVATT. Sir, I am really not in the position to respond to that.

Mr. HUNTER. General or Mr. Kozlowski, just so we have the context there because you have got C–141.

Mr. KOZLOWSKI. C–17 is in terms of pounds.

Mr. EVATT. I am not sure Don can see, sir. What we have here is a 747 carrying a 140,000 pounds from Dover Air Force Base in Delaware unrefueled to Ryad. It off-loads in Ryad and then without taking on fuel would redeploy to Kiro, thereby minimizing its down time in the theater so that the turn around would be much quicker in the theater. That is what is on the chart. I wasn't sure you could see it, sir.

Mr. KOZLOWSKI. I'm not sure about what went into this calculation. A C–17 unrefueled can carry 160,000 pounds to 2,400 nautical miles, or 130,000 pounds, 3,200 nautical miles; without refueling, it can go damn near anywhere.

Mr. HUNTER. OK, thank you. OK, proceed.

Mr. EVATT. The point on this chart, sir, is that we believe that should the Air Force and the Congress decide to replace some portion of the 141 fleet with 747's, it would have a rather significant multiplier effect during crisis situations because of the extremely large payload long-range capacity of the 747.

It could, as we show on this chart, go all the way to Ryad carrying 140,000 pounds unrefueled. The 141, as we understand it, to fly that same distance, land at Ryad, off-load and then redeploy to Kiro without refueling again while at Ryad would carry about 60,000 pounds and require two refuelings in the process.

The savings of those two tanker sorties, not only do you get more there, but two tankers aren't committed to the airlift mission, therefore freeing up those critical assets during a deployment phase for other missions in support of fighters, bombers, or whatever the need may be.

Mr. HUNTER. Sir, do you have a chart like that with a C–17 on it?

Mr. EVATT. No, sir, I do not. We don't have C–17 data, so I'm not able to address that, sir.

Sir, this simply is a chart of our worldwide 747 support facilities for our commercial customers. We provide 24 hour replacement service worldwide to all of the 60 commercial enterprises that use the 747 fleet.

I might add that the Air Force has a similar experience base with the KC–10 tanker aircraft that they have in the fleet. This simply is to say that we think a commercial aircraft used along with the military unique airlift assets, that you could save some money because you don't have to have the total logistics system with the commercial aircraft that would no doubt be required for a military unique.

This last chart, sir, I think goes to address possibly some of the questions that have already been raised to-date. I apologize. You can't see, from where you are, the loader, but it is right here in front. You can see the line of Army vehicles that were loaded on board the aircraft in the test that the Army and Air Force conducted last year.

Mr. HUNTER. Since you got that line there, about how long would it take to pop those vehicles up and get them in, just in a general sense?

Mr. EVATT. I think it is an hour, sir, but the Air Force would have to give you their expert answer. As I said, our experience with our commercial companies say that a single person operating the power loading system loads the entire 747 in just under an hour's time. We think with this loader you could get very close to that. Only they could answer precisely because we just don't have the knowledge of all of their procedures.

Mr. HUNTER. OK, thank you.

Mr. SISISKY. Is this the type loading that UPS and Federal Express use?

Mr. EVATT. Yes, sir. All of our commercial freighters have this system. There is also a very large door on this side. So, they can actually use both simultaneously if they like.

Mr. SISISKY. They make money off it.

Mr. EVATT. Again, this is up off the ground. I want to reemphasize that this is not a roll-on/roll-off as you get with a military unique system.

Sir, that completes the charts that I would like to address at this time. Of course, we would be delighted to answer any further questions.

Mr. HUNTER. OK. Thank you very much, Mr. Evatt.

Could you answer just one last question? What is the cost on this aircraft?

Mr. EVATT. Sir, as a commercial product we have a catalog price.

Mr. HUNTER. What is your two for one sale?

Mr. EVATT. I wish we had one today, sir. Our catalog price in 1995 dollars is $156 million a copy for the aircraft. That is the commercial version as it comes off the line. There are several options associated with that. That does not include the military unique modifications that one might be asking for, such as the larger door.

Mr. HUNTER. Have you done that?

Mr. EVATT. You are asking us a question in a public forum, sir, of a competition that we are about to go into. So, let me respond to that by saying, plus or minus 10 percent of the catalog price, we believe, will more than cover the potential modifications that the Air Force might want as we understand them today.

Mr. HUNTER. Thank you, sir. We appreciate your briefing.

Mr. EVATT. Thank you, sir.

Statement on Non-Developmental Airlift Aircraft

for
Hearing on Strategic Lift

before
Subcommittee on Military Procurement
Committee on National Security
U. S. House of Representatives

on
March 30, 1995

Presented by

Mr. James W. Evatt
Vice President for Business Development
Defense & Space Group
The Boeing Company

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Until March 30, 1995, 9:30 a.m.

Good Morning, Mr. Chairman. I am Jim Evatt, the Vice President of Business Development for the Boeing Defense & Space Group.

On behalf of The Boeing Company I am pleased to appear before you, Mr. Chairman, Mr. Skelton, the Ranking Member, and the other Members of this Subcommittee. I am here to present to you our views on the Non-Developmental Airlift Aircraft, known as the NDAA program.

I first would like to touch on the background of NDAA and then describe briefly the 747 aircraft that we are proposing for this competitive procurement. I also will address why I believe a mixed fleet provides a cost effective and timely solution to the strategic airlift requirements. One key advantage of the NDAA concept is that it allows the Air Force to benefit from a proven commercial product -- such as the 747 -- which is in production today. I will highlight some of these benefits and then conclude.

NDAA Background

The NDAA program was initiated in 1993 when the Air Force was grounding aging C-141Bs for structural problems and also realized the C-17 would not be coming on-line as originally planned. The Air Force turned to The Boeing Company and others to understand how in-production freighter aircraft could alleviate this situation in light of the ever increasing importance of its airlift capabilities. Recognizing the chronic airlift problems, Congress urged the Department of Defense to seek a viable, lower cost alternative to help satisfy the strategic airlift requirements.

This Committee is credited for leading the efforts to resolve this dilemma. In FY94 Congress took additional steps by authorizing and appropriating $97.9 million for the NDAA program. Last year, Congress also passed the Federal Acquisition Streamlining Act which allows the Department of Defense to amend its procurement regulations to facilitate the acquisition of commercially available products without imposition of unnecessary burdens and costs. The NDAA program was identified as a pilot project for this streamlined acquisition process.

In response to FY95 Congressional direction, the U. S. Air Force will conduct this year a competitive procurement for non-developmental aircraft. The final request for proposals is to be released shortly. While the source selection board will choose the best candidate system in August, their selection will not be announced until November. A decision will be made at that time on the mix to be procured of non-developmental airlift aircraft and C-17s.

Background of the 747 Program

The Boeing Company will propose its 747-400 Freighter for the NDAA program. A few statistics will help to demonstrate the breadth of the 747's capability and why we believe this aircraft is ideal to help meet the Air Force's airlift requirements.

Since the first 747 entered service in 1970, 1,000-plus of the aircraft have accumulated more than 40 million flight hours in the hands of sixty commercial operators and the U.S. government. These are proven aircraft that are heavily used by their commercial owners. Yet they have demonstrated a schedule reliability of approximately 98%

across the entire fleet. Moreover, in the late 1980s, Boeing invested several hundred million dollars to modernize the 747 design to keep it at the leading edge of commercial airplanes. The current 747-400 models are very modern airplanes with advanced electronics and avionics, highly reliable engines, improved aerodynamics, excellent fuel economy, and extensive corrosion protection. The cockpit has been redesigned for a two-person flight crew consisting of the pilot and copilot.

From inception, one of the 747's missions has been to haul cargo. Approximately 140 747 freighters have been built. This 747 fleet accounts for about 31 percent of the world's commercial freighter capability. For those customers wanting a dedicated freighter the 747-400F is designed so that the entire nose of the aircraft opens as well as the large side cargo door. Both are standard features on the 747-400 Freighter.

The 747-400 Freighter also offers a modern, powered cargo transfer system built into the aircraft's floor. Commercial air freight companies use the powered system to easily load and unload pallets or containers of equipment in less than one hour with a single crew member.

The Military Requirement

Based on discussions with the Air Force, it is understood that the soon-to-be released Mobility Requirements Study Bottom-up Review Update establishes an overall airlift requirement of between 49 and 52 million ton miles per day (MTM/D). This is a highly demanding task. The Air Force 1995 Air Mobility Master Plan concludes there is urgent need to modernize the strategic airlift fleet. The plan points out, that the majority of the Air Mobility Command's

aircraft are more than 25 years old and that some, such as the C-141, have had their average daily flying hours and cargo weight sharply curtailed because of corrosion and structural problems. Furthermore, the dramatic reduction in the presence of U.S. forces overseas has increased significantly the day-to-day demands on the Air Mobility Command and that also in the future increasing deployments from the continental United States will be required.

The Military Utility of the 747

As the Air Force considers options for modernizing its airlift fleet, we believe the 747-400F program offers an affordable option to meet its need. This becomes particularly apparent if overall requirements are divided into cargo types. There are some military unique airlift requirements that only the existing assets in the Air Force inventory can satisfy: airdrop, roll-on, roll-off and austere airfield capabilities. This same condition applies to "outsized" cargo that requires a C-5 or C-17.

However, a significant part of the of airlift requirement is "general airlift" similar to what commercial freight operators carry every day. Bulk and oversized cargo missions can be performed by both the 747-400 Freighter and current strategic airlift. The chart entitled "Complementary Non-Core Airlift" (Chart 1) shows the various capabilities of the 747-400 Freighter in comparison to other Air Force strategic airlifters for all of the typical airlift missions.

This point is reinforced by the next chart entitled, "Airlift Role for Commercial NDAA," (Chart 2) which illustrates for the examples shown that only a small percentage of airlift

requires military unique aircraft. For example, during Desert Shield/Storm 80 percent of the cargo requirements were general airlift and could have been carried by a 747-400F. For the Somalia relief operation, this percentage increases to 95 percent.

In discussions with the Air Force regarding the two Major Regional Contingency scenarios, the 747-400 Freighter can carry 65 percent of the total airlift requirement with the basic 747-400 Freighter and 75 percent with the added option of stronger floors and a wider side cargo door. In this enhanced version, all of the bulk cargo and up to 80 percent of the oversized cargo will fit in the 747-400F.

There is a clear need for aircraft capable of performing military unique missions, such as carrying outsized cargo. The number of required core airlift assets, however, could be complemented by less expensive commercial airplanes that can perform a substantial part of the total strategic airlift mission. For example, a single 747-400 Freighter can provide .21 million ton miles per day (MTM/D) which is more than three times the capability of a C-141B. This unique high payload, long-range aircraft at commercial prices provides a 747 NDAA fleet with outstanding flexibility for the Air Mobility Command.

The range of the 747 also offers the Air Force a distinct advantage. The 747-400 Freighter is without a peer in terms of combined range and payload. The chart entitled, "Payload Range Comparisons," (Chart 3) shows how the 747-400 compares with the strategic airlift assets in the U.S. Air Force inventory today.

The 747-400 Freighter can carry 240,000 pounds of cargo without refueling for more than 4,500 nautical miles or 140,000 pounds payload to about 6,900 nautical miles

without refueling. This is equivalent to the distance between Dover Air Force Base in Delaware and Riyadh, Saudi Arabia. In light of the heavy demands on tanker assets during a military build-up or conflict, the 747-400 range without refueling would be an important force multiplier feature.

The chart entitled, "Airlift Efficiency Comparisons" (Chart 4) shows how the 747-400 compares to a C-141B airlifting equipment and supplies to Riyadh, Saudi Arabia. Without refueling, the 747-400F will have enough residual fuel to fly to a recovery airbase in a neighboring country. In this example, it recovers in Egypt. This is an important capability because minimizing congestion on the ground at the forward airbase of operations was one of the lessons learned in Desert Storm. It is reported aircraft waited up to six hours in a queue to refuel in theater.

Advantages of a Commercial 747

Commercial 747s are known for their efficiency and ease of cargo handling. Last year Boeing (along with others) was awarded a contract to permit Air Force personnel to demonstrate the loading and unloading of military equipment on commercial-type aircraft. The sheer volume of the equipment and the speed with which it was loaded into the 747 freighter were significant. The Air Force team was highly impressed with the ease and speed of the loading and unloading operation.

In addition to the significant contribution that the 747 Freighter can make in meeting strategic airlift requirements, there are additional benefits gained by the aircraft being a commercial product. The 747 is a low risk solution with years of successful operation by commercial

airlines. Worldwide support already is in place and the 747 offers the Air Force great flexibility in configuration, rate of acquisition and ability to adapt to any affordable funding profile.

The maturity of the 747 aircraft, the overall size of the fleet and its use by such a wide variety of customers provides a unique advantage for the Air Force: an existing worldwide support system. As shown in the chart entitled, "Worldwide 747 Support," (Chart 5) there are more than 100 field service locations around the world that can provide support to the Air Force ranging from flight operations, maintenance by trained mechanics, field service engineering, spares and logistics.

The Boeing Spares Distribution Centers currently provide one-day worldwide support to a fleet of 1,000 747s. With this broad-based support infrastructure, the Air Force can rely on "just-in-time" access for its spares, which will provide considerable cost savings over the life of the program. This worldwide support system will ease overall logistical requirements and provide flexibility for the Air Force during high intensity operations, such as Desert Shield/Storm or the relief operations in Somalia.

Another advantage offered by the 747 is the configuration options it provides the Air Force. Commercial customers purchase the aircraft in different configurations to meet their specific needs. The Air Force could do the same. They could order the basic 747-400 Freighter, or request changes for a wider door or additional strengthening of the floor. As with the commercial versions, these changes could be accomplished "in-line," during production, and would be commercially priced as options to the basic configuration. Because it is a commercially produced product, the catalog price of the basic 747-400F is publicly available. However,

our proposal to the Air Force -- just like it is for our commercial customers -- would be influenced by the number purchased, timing for delivery and related factors. (Refer to Chart 6 entitled, "Strategic Airlift Modernization Options.")

Since the 747 will be in commercial production for many years to come, the Air Force will have the flexibility to acquire the aircraft in different quantities in different years. For example, it could buy four one year, eight the next and a different number the following year, if necessary. Whether the reason for these fluctuations were budget affordability or changes in threat and requirements, the Air Force still would retain the benefit of price predictability of a commercial off-the-shelf product in contrast to a typical military procurement. These common sense attributes are endorsed by those of you in Congress and, indeed, are ones being advocated by Secretary Perry as he seeks broader use of commercial products.

Extensive commercial service has demonstrated low life cycle costs for the 747-400F. The existence of an active production line ensures that the cost of replacement parts will be lower when compared to out-of-production models. Also, the cost of commercial parts has been historically considerably less than milspec parts. Additionally, there are private facilities for maintaining commercial 747s that could provide depot maintenance and modifications for the Air Force at lower costs than military-unique operations. Finally, the cost of training flight and maintenance crews can be lower by using existing commercial training at Boeing and other facilities.

The Economic Benefit of the 747

The economic impact from purchasing 747-400 Freighters for NDAA would be considerable. An NDAA program at a rate of 6 per year would sustain an estimated 68,000 direct and indirect jobs nationwide. There is a wide network of suppliers across 41 states, with significant work being performed in Connecticut, California, Texas, Kansas, Oklahoma, Ohio and Washington.

For the last five years, The Boeing Company has been the leading exporter contributing over $80 billion in goods and services to the U.S. trade balance. The 747 is a major component of that statistic. About 90% of 747 sales during this period have been to international customers. The NDAA's contribution to strengthening the overall 747 production will lead to improved international competitiveness of the U.S. aerospace industry.

Conclusion

In conclusion, I would like to reiterate that The Boeing Company is responding to a request for proposal for a non-developmental airlift aircraft. We are working closely with the Air Force and are encouraged by their good faith efforts to accommodate the shift toward commercial practices. We have been asked to provide a series of force options we believe will demonstrate the advantages of a mixed fleet acquisition.

I believe that the NDAA concept remains compelling, especially given the capability of an aircraft like the 747 to alleviate or erase the shortfall in strategic airlift -- and to do so quickly. The extensive and successful commercial experience with the 747 is well-documented and provides

the Air Force multiple benefits including acquisition flexibility, a worldwide support infrastructure, proven high utilization and readiness rates, predictable commercial pricing and attractive life cycle costs.

The Boeing Company believes the NDAA program makes sense for our military, for our nation's defense and for the taxpayer. Studies by Institute for Defense Analysis, the Rand Corporation and the General Accounting Office show the benefits of a mixed fleet of strategic airlift assets consisting of commercial freighters and military aircraft. The question is when the procurement of commercial freighters under the NDAA program should begin. We think the time to begin the NDAA program is now.

Thank you, Mr. Chairman, for the opportunity to appear here today and testify before this subcommittee. I am willing to answer questions at the appropriate time.

Complementary Non-Core Airlift
(Aircraft Options)

	Cargo Type					Specialized Capability		
	Troops	MEDIVAC	Bulk/Pallets	Oversized	Outsized	Airdrop	Roll-on/off	Austere Field
747-400F	✔	✔	✔	✔				
C-141B	✔	✔	✔	✔		✔	✔	
C-5	✔	✔	✔	✔	✔	✔	✔	
C-17	✔	✔	✔	✔	✔	✔	✔	✔

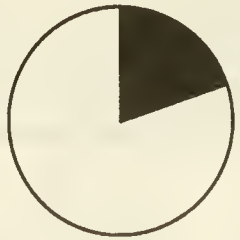
General Airlift

Military Unique Airlift (Core)

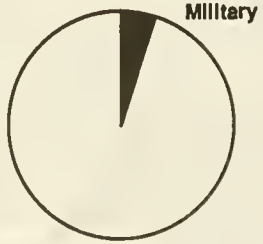
Chart 1

Airlift Role for Commercial NDAA

Desert Shield/Storm



Somalia (Restore Hope)



2 Major Regional Contingency Scenario

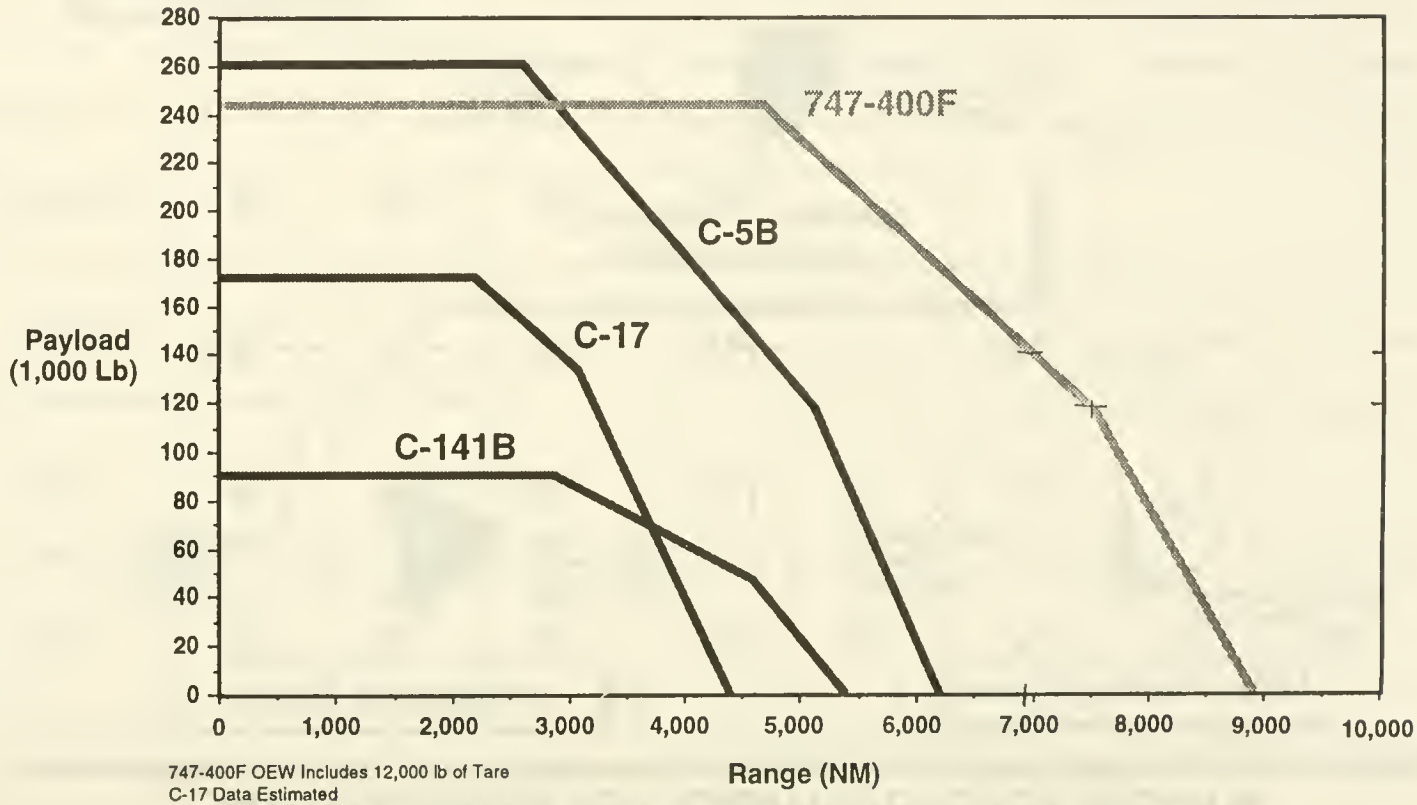
Note: Based on Boeing analysis of Mobility Requirements Study - Bottom-Up Review Update strategic airlift requirement

Commercial NDAA's primary role is addressing large General airlift requirement

Chart 2

747 NDAA

Payload Range Comparisons



747-400F OEW Includes 12,000 lb of Tare
C-17 Data Estimated

Chart 3

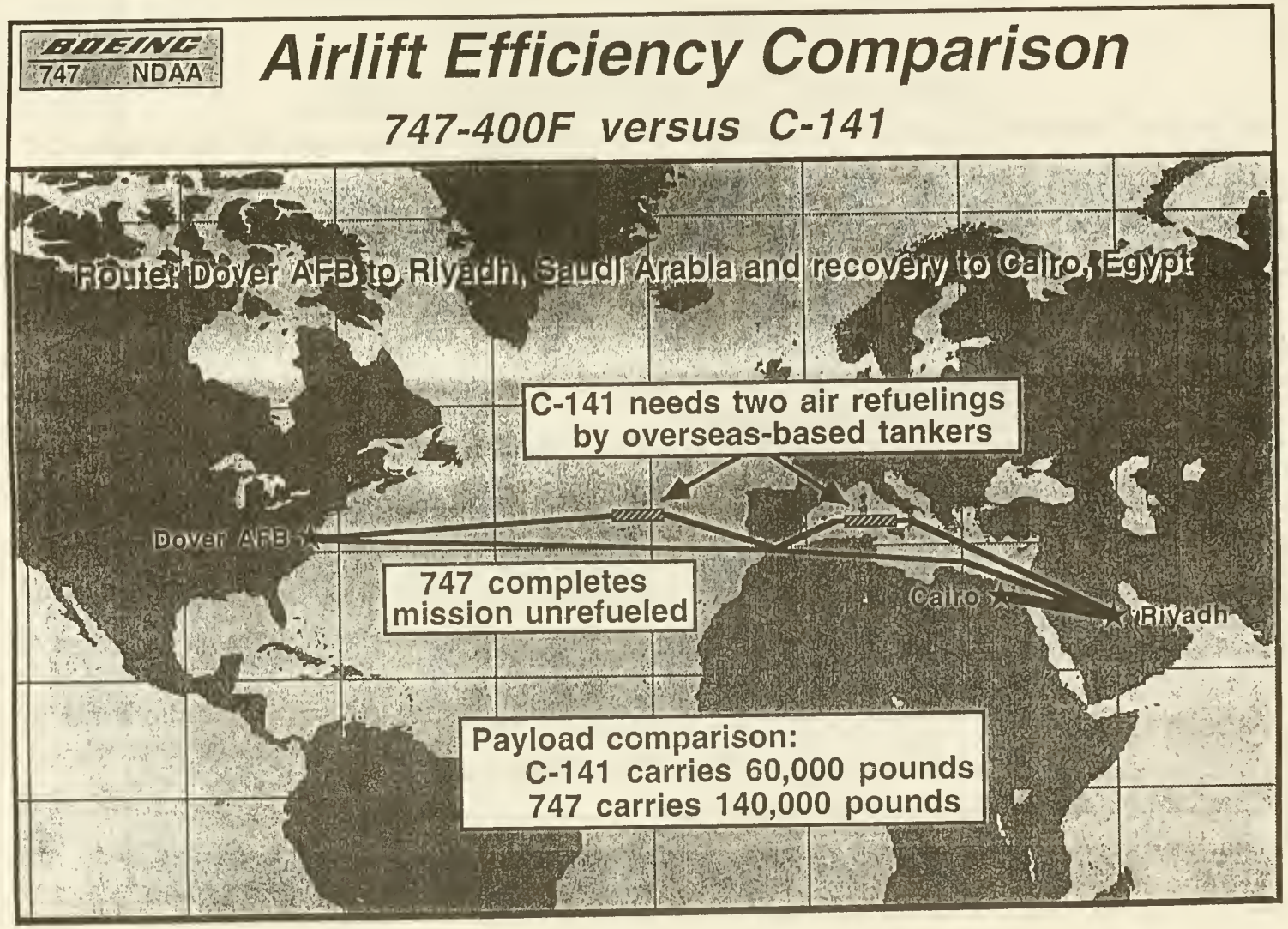

BOEING
747 NDAA
Airlift Efficiency Comparison
747-400F versus C-141
Route: Dover AFB to Riyadh, Saudi Arabia and recovery to Cairo, Egypt
C-141 needs two air refuelings by overseas-based tankers
Dover AFB
747 completes mission unrefueled
Cairo
Riyadh
Payload comparison:
C-141 carries 60,000 pounds
747 carries 140,000 pounds

Chart 4

BOEING
747 NDAA

Worldwide 747 Support

- ● Customer Service Representatives
- ◆ Spare Parts Distribution Centers
- ▲ Avionics Repair Stations

Chart 5

Strategic Airlift Modernization Options

Fleet Mix Options		Years to Acquire 747 NDAA Fleet			747 NDAA Fleet Price ***
C-17 Total *	747 NDAA Total **	@ 4/yr	@ 8/yr	@ 12/yr	
40	48	12.0	6.0	4.0	$7,440M
72	29	7.3	3.6	2.4	$4,495M
100	12	3.0	1.5	1.0	$1,860M
120	0	-	-	-	0

* Select C-17 fleet sizes from 7 Feb 95 draft NDAA RFP

** Fleet size based on million tons miles per day and backup factors from 1995 AMC Airlift Master Plan

*** 1995 Catalogue price of approximately $155M

Chart 6

Mr. HUNTER. Now, we are going to hear from Mr. Don Kozlowski who is vice president and program manager of the C–17 Aircraft Program of the McDonnell Douglas Corp.

Sir, thank you for being with us today. The floor is yours.

STATEMENT OF DON KOZLOWSKI, VICE PRESIDENT AND PROGRAM MANAGER, C–17 AIRCRAFT PROGRAM, McDONNELL DOUGLAS CORP.

Mr. KOZLOWSKI. Thank you, Mr. Chairman.

We are very pleased to be here to respond on our view of the status of the C–17 Globemaster III Program. As General Rutherford told you, we are very proud to also state that the airplane is in service and is operational down at Charleston. In fact, you should all go see it. Those that have witnessed it are all pretty impressed.

We have delivered 18 production aircraft; 14 of those are in service at Charleston, as General Rutherford pointed out. The last six airplanes have been delivered early and at significantly improved quality.

Prior to last year, five aircraft were late. Some were significantly late. The flight test program from the development phase is over. We finished that in December on time. The overall development program is complete as well. We are transitioning into a stable production configuration and currently building to the rate of eight aircraft per year.

All of the aircraft in the fleet are being brought up to one configuration for full specification compliance as well as a major reliability improvement program. We believe the aircraft in service are performing quite well.

There was a day, not too long ago, when the record wasn't quite so good. The program was referred to as problem plagued, beleaguered, troubled, et cetera. I am happy to tell you that with your support and with the advice and counsel and guidance of Secretary John Deutch to help implement the omnibus agreement, it all setup a climate that has changed considerably.

With that omnibus agreement between Dr. Deutch and John McDonnell well over almost a year and a half ago, and recently approved by Congress, we set out to change the overall environment. We basically have done that.

In terms of the production line, the aircraft are not only early, but the quality is dramatically improved. Our cost of quality last year was cut by 58 percent. We are out to cut it in half again this year.

We did a lot of other things though too. We cut the grievances from over 1,300 to just a couple of hundred. Those are going down daily. We cut the safety rate in the factory, which was twice the national average. Today, it is half the national average. We cut it by a factor of four. It is going down every month.

All of that speaks for a stable production configuration in the airplane and a stable factory that produces the airplane. Last year in December, we completed the most extensive flight test development program for an airlifter just ever in history.

It was over 10,000 flight test points; 1,200 flights; 4,300 flight hours. I am happy to tell you that program was concluded success-

fully in late December. During that test program, we set 22 world records.

One of those was for a stole shark takeoff and landing demonstration with a 40,000 pound payload. If you can visualize the parking lot behind Capitol Hill, we took off with 40,000 pounds, climbed to 2,000 meters and landed with that payload in less than 1,400 feet. It is a little bit less than the parking lot over there.

C–17 is also unique in the sense that we can get off in a 3,000 foot strip between here and the Dirksen Building with 160,000 payload. What is 160,000 pounds? It is a little bit more than one of those Army XM1 tanks and quite a few other things.

We have a major event coming up in July; reliability, maintainability, and availability evaluation which will validate what we believe to be the most friendly, maintenance friendly, airlifter ever designed.

We have had two dressed rehearsals in the last several months getting ready for this event. I am happy to tell you and very proud to tell you that the aircraft in fact has succeeded all of our expectations to this point. We fully expect to pass that evaluation in July with flying colors.

The most gratifying thing in recent months, at least from my point of view, is the comment we get from the men and women that use the C–17 at Charleston and from some of the Army users who are our primary customer.

The pilots love it. The load masters that work in the back of the airplane love it. The maintainers are very delighted with it as well. In short, we believe the operational squadron down at Charleston is demonstrating everyday just what the C–17 was intended to do.

We believe, as a corporation, we have demonstrated improved performance in delivering the aircraft to schedule and meeting our quality goals. The one single major factor that is the focus of all quality management at McDonnell Douglas is reducing the unit cost of the C–17.

We committed the $100 million called for in the omnibus settlement for production improvements on the line. We have in fact invested moneys like that before. We are continuing that investment stream. We have been working with the Air Force should cost team that General Hawley described to essentially implement every reasonable cost reduction initiative we can.

I am happy to tell you that we can see a clear path for the 80 aircraft remaining, after the initial 40, that our cost in 1995 dollars for the remaining 80, would be approximately $186 million per unit. That is for our portion of the C–17.

We don't provide the engines and a few other things. When you wrap it all up in a unit cost, we are talking approximately $210 to $220 million.

Mr. HUNTER. Mr. Kozlowski, could you give us what species of cost that was, fly away cost, the $186 million?

Mr. KOZLOWSKI. It is a fly away unit cost; $186 million for the nuclear biological chemical [NBC] portion of the program in 1995 dollars. That equates roughly to a full-up unit fly away cost of somewhere between $210 to $220 million.

Mr. HUNTER. OK, thank you.

Mr. KOZLOWSKI. I might also add, we continue to work toward cost reductions. We have the window between now and August 1 to do, hopefully, much better.

When Dr. Deutch appeared before Congress and said 40 and no more unless NBC performs, I have got to tell you, we heard you all the way from Harry Stonesaffer, our new CEO to the mechanic on the shop floor.

There is a new sense, and well founded I believe, of pride in the C–17 by the crews that use it and the more than 30,000 people worldwide that build it, as well as others who have had the opportunity to witness it in action. It is a very, very unique airplane.

The C–17 is the only realistic alternative for airlift modernization that can deliver combat capability directly to the forces that need it, using only a crew of three with minimal support equipment for off-loading.

Furthermore, the C–17 can also provide humanitarian relief and intra-theater movement to combat forces from austere fields in crisis situations around the globe. It is, as recognized by the Collier Trophy Citation, the most versatile airlift aircraft in the history of aviation.

It was, after all, designed as the core airlifter. It has demonstrated that it can perform the same categories of missions as the C–5's, the C–141's, and the C–130's do today. Let me digress a moment and try to elaborate on that.

This is a large airplane in terms of the wide body class, but it has the footprint of a C–141. It doesn't take anymore ramp space. It can get into tight situations like the C–130 and fields less than 3,000 feet.

It has thrust reversers, a massive high technology high lift system. We can literally do a tactical descent which otherwise means almost falling out of the sky at sync rates excess of 20,000 feet per minute, get to the threshold of the runway, using thrust reverses in a very impressive braking system, stop within 3,000 feet with that 160,000 pound load.

It has the muscle of a C–5 in the sense that it can carry the outsized cargo, but it can get into the short fields and the tight places that a C–130 does today. The only thing is, it can carry about four times what a C–130 carries.

It can do a lot of amazing things, including turning around on a 90-foot wide strip, backing up at 2- percent grade, and getting in and out of tight places, not only on a ramp, but in the combat zones as well.

Again, let me just say, we are very proud that it is such a unique airplane. Let me conclude, Mr. Chairman, by saying that McDonnell Douglas was, is, and continues to be committed to the successful execution of the C–17 Program. Airlift is one of the most critical requirements to support our forces and to rapidly demonstrate credible U.S. presence wherever and whenever needed.

Thank you, Mr. Chairman.

Statement of

DON R. KOZLOWSKI

Senior Vice President
C-17 Program Manager
McDonnell Douglas Aerospace

before the

Subcommittee on Procurement,
U.S. House of Representatives
Committee on National Security
March 30, 1995

Chairman Hunter, members of the Procurement Subcommittee, we are pleased to have the opportunity to appear before you today to provide our assessment of the C-17 Program. We are proud to tell you that the C-17 Globemaster III is in operational service today, as planned, providing the critically needed airlift capability for the Air Mobility Command. The 17th Airlift Squadron of the 437th Airlift Wing is providing worldwide service on routine missions to Europe, the Far East, the Middle East, as well as Central and South America.

Eighteen production aircraft have been delivered. The last six were delivered early, with significantly improved quality. Flight test is complete. The developmental phase is over. The design is stable and we are transitioning into full production at a rate of eight aircraft per year. Delivered aircraft are being outfitted for specification compliance and reliability improvements. Aircraft in operational service are performing extremely well. Aircraft deliveries are "on time" and program costs are coming down dramatically with each delivery.

There was a day, not too long ago, when the C-17 program was described as beleaguered, troubled or problem-plagued. The truth was, we had been delivering aircraft late to schedule and there was a need for considerable improvement in quality and reduction in cost. Additionally, the program was, for many years, founded on a relationship between contractor and customer that, at best, can only be regarded as adversarial.

But not all of the C-17's circumstances were negative. The requirement for the aircraft's unique military capabilities has consistently received solid support from the military and particularly from the Theater Commanders who need that airlift capability -- now more than ever. Additionally, Dr. John Deutch, then Undersecretary of Defense for Acquisition,

backed by a recommendation of the Defense Science Board and the solid support of members of this subcommittee and others in the Congress, created the business environment and spirit of cooperation that evolved from the Omnibus Settlement. Allow me to elaborate on some of the improvements in the program.

In 1993, we delivered five aircraft. Four of them were late -- including one which was more than 5 months late. By contrast, in 1994, we delivered eight C-17s. Five of them were on or ahead of schedule -- in one case 43 days early. Overall the last six aircraft were delivered early with improved quality and no work shortages and P-19 will be delivered in April ahead of schedule.

Rework and repair in the manufacturing process or during assembly is costly in both labor hours and materials. We reduced the rework and repair costs in 1994 by 58 percent. We plan to cut our cost of quality in half again in 1995 and to continue those reductions in succeeding years. We've also cut the time it takes to assemble the aircraft--the assembly span time--by more than one half from the first production C-17 to the most recent delivery, P-18, and reduced the span time in 1994 alone by 20 percent.

Last December we completed the most extensive developmental flight test program ever undertaken by any transport aircraft. More than 8,000 flight test specification points and 2,200 development test points were completed during 1,200 flights and 4,300 flight hours.

During that program, the C-17 set 22 world records. One of the records was for a short takeoff and landing, a capability for which the C-17 was designed. The test C-17 took off in less than 1,400 feet, climbed to 2000 meters, and landed in less than 1,400 feet, while carrying a payload of 44,083 pounds. By way of comparison the C-17 broke the previous payload record held by a Russian aircraft for that mission by nearly ten-fold.

Static testing to verify the strength of the aircraft was successfully completed last April with all structures tested achieving 150 percent of design limit load. The durability testing program reached 45,000 equivalent flight hours in November -- the one-and-a-half lifetimes required to meet the warranty provisions of the contract. After an extensive inspection, durability testing has resumed and last week passed 50,000 equivalent flight hours on the way to 60,000 hours, or the equivalent of two lifetimes.

The month-long demanding Reliability, Maintainability and Availability (RM&A) evaluation scheduled to take place in July and August of this year will be the foundation for validating what we believe to be the most maintenance-friendly airlifter ever designed. The RM&A evaluation will also be one of the critical points in the Milestone IIIB Defense Acquisition Board decision. In preparation for the evaluation, the Air Force has conducted two dress rehearsals. We are pleased to say that the C-17 has met or exceeded our expectations in those tests --and in some cases the numbers are three and four times better than required. The extensive work we did up front to make the aircraft reliable and easy to maintain will mean lower life-cycle costs -- a big factor in times of declining defense budgets while maintaining an emphasis on readiness.

We have additional cause to be encouraged as we continue to receive very favorable comments from the aircrews and maintenance personnel who fly and maintain the C-17s at Charleston AFB. The pilots, the loadmasters and the maintainers have nothing but praise for the aircraft. In our view, their comments are the most valid testimonials. They've flown the aircraft to Europe, the Middle East, Panama, Caribbean, and Japan. They've conducted extensive training in the air and landed at all types of airfields, large and small, developed and austere. Charleston aircrews are using the C-17 every day the way it was meant to be used. They are taking advantage of the military capabilities of roll-

on, roll-off loading, combat off-loading, airdropping troops and their equipment, and unique backing-up and ground maneuverability. In short, the operational wing at Charleston is demonstrating every day the capabilities of the C-17 that have no counterpart in any other airlift aircraft. The Air Force professionals who must depend on the C-17 to achieve the United States' "Global Reach" missions provide a true assessment of the value of the C-17.

We have achieved what we believe to be improving performance in delivering aircraft to schedule and meeting our quality goals. The one major challenge remaining is reducing the unit cost of the C-17, and that is the single highest priority for the leadership of McDonnell Douglas Corporation.

We've committed the $100 million called for in the Omnibus Settlement for productivity improvements to achieve cost reduction. In fact the Corporation will actually be investing more than was called for in the Omnibus Settlement to achieve improvements that will drive down the costs. We've been working with an Air Force "Should Cost" team to ensure that every possible cost-saving measure is considered. Additionally, we have, in unambiguous terms, informed our suppliers that affordability, while not sacrificing quality, must be their number one priority as well.

In closing we want to reiterate that the C-17 is back on track and rapidly becoming the finest airlift aircraft ever built. Winning the 1994 Collier Trophy rewarded the faith and hard work that have gone into the program over the 14 years since the C-X Source Selection Committee chose the C-17 as the airlifter for the twenty-first century. But, we would not be where we are today without the leadership of OSD and others in the Department of Defense as well as the support of Congress.

Dr. Deutch and the Congress challenged us - holding our feet to the fire and saying basically, "40 and no more unless McDonnell Douglas Corporation performs." We heard you, all the way from our new CEO, Harry Stonecipher to the mechanic on the shop floor. Today we are confident that we are transitioning successfully from a troubled program to a respected weapon system procurement effort.

There is a new and well-founded sense of pride in the C-17 by the crews that use it and the more than 30,000 people, worldwide, that build it--as well as others who have had the opportunity to witness it in action. The C-17 is the only realistic alternative for airlift modernization that can deliver combat capability directly to the forces that need it using only a crew of three with minimal support equipment for offloading. Furthermore, the C-17 can also provide humanitarian relief and intra-theater movement of combat forces from austere fields in crisis situations around the globe. It is, as recognized by the Collier Trophy citation, '...the most versatile airlift aircraft in the history of aviation." It was designed as the core airlifter and has demonstrated that it can perform the same categories of missions as the C-5s, the C-141s and C-130s do today. It is the only aircraft that can provide the necessary flexibility to do whatever is needed, anywhere, anytime.

McDonnell Douglas was, is, and will continue to be committed to the successful execution of the C-17 program, because airlift is one of the most critical requirements to support our forces and to rapidly demonstrate credible U.S. presence wherever and whenever needed.

Thank you.

Mr. HUNTER. Thank you, Mr. Kozlowski.

Let me ask you, is McDonnell Douglas going to offer a candidate in this NDAA competition?

Mr. KOZLOWSKI. We believe our attention needs to be focused on the primary airplane to fulfill the airlift requirement, the C–17, and therefore we decided to no-bid the NDAA.

Mr. HUNTER. OK. Thank you.

General, let me just ask you one fast one and move on to other members here. Mobility Requirements Study Bottom-Up Review that you made a change or a revision in assumptions and results going to the bottom-up review update.

I will just ask you to describe what changes you made in the assumptions with respect to significant warning time, rapid decision to deploy forces, early call-up of CRAF stages, early call up of Reserves. Early deterrent options allow time to position mobility assets and deploy personnel. What does that mean?

Mr. KOZLOWSKI. Sir, if I could, if I get into great detail on this, we will need to go closed in the hearing. Let me simply state that the assumptions are approximately the same; very close to the same between the Mobility Requirements Study and the Mobility Requirements Study Bottom-Up Review.

There are no major changes, what I consider major changes, in the assumptions, per se. If you would like to go into further detail or if I can see you later, I would be more than happy to talk about it.

Mr. HUNTER. Fine, let's do that later.

Let me say, once again, we are privileged to have the chairman of the full committee and the ranking member of the full committee here with us. What I would like to do is to give them an opportunity to ask you questions and we will go on down the line.

Chairman Spence, do you have any questions for these gentlemen?

Mr. SPENCE. I thank the Chairman. I just want to welcome our witnesses today. I certainly appreciate your testimony. I will let some of the other members ask questions.

Mr. HUNTER. Does the gentleman from California have a question?

Mr. DELLUMS. Thank you, Mr. Chairman.

I do have a number of questions, but at this time, I would reserve my time allowing more junior members to have an opportunity to ask questions. We will come in later.

Mr. HUNTER. OK. Mr. Sisisky.

Mr. SISISKY. Thank you, Mr. Chairman.

The 80 aircraft that you are talking about is built over what period of time, Mr. Kozlowski?

Mr. KOZLOWSKI. Lot 8 starts in the next year in the fiscal 1996 cycle. The profile is 88881012; builds out to, I believe, 2004, the completion of 120 airplanes.

Mr. SISISKY. How many can you build? I think we have a problem with the 141.

Mr. KOZLOWSKI. In fact, from the cost standpoint, Mr. Sisisky, we could take out another $25 million if we get back to what I call a reasonable rate on this class of airplane. When the program started, the country was talking 29 a year.

If we could get back to around 15 a year, we could take $25 million out of the airplane. The reason I cite 15 is because that is basically what the factory capacity is today without any additional capital investment.

Mr. SISISKY. You would not need to build any plant or anything else.

Mr. KOZLOWSKI. No, sir.

Mr. SISISKY. Your line can take that, I guess, through the learning curve.

Mr. KOZLOWSKI. Absolutely.

Mr. SISISKY. Basically, what you are talking about is an aircraft that would cost about 160——

Mr. KOZLOWSKI. For our portion of the airplane is $161 million in 1995 dollars for our portion of the airplane.

Mr. SISISKY. You talked about maintaining this. How has the maintenance been on the C–17? How do you make it easier to maintain another aircraft?

Mr. KOZLOWSKI. This airplane was designed, Mr. Sisisky, about 15 years ago with I guess you would call it an evolution that goes back into the early 1970's.

Mr. SISISKY. You didn't tell me the answer to that question.

Mr. KOZLOWSKI. Let me just tell you, it is one of the things we have got to be most proud of. It takes about one-tenth the amount of effort to fix this airplane than we originally specified. You do that by providing a lot of access panels around the airplane to make it easy to get to the equipment.

First, you try to design it so it doesn't fail very often. Being human and realistic, the equipment does fail. I am happy to tell you it is failing only about half the rate at which we had originally predicted.

When it does fail, it is extremely easy to fix, both in terms of getting access to the equipment, the time to remove that equipment, as well as the time to repair it and get the aircraft back in service. That all translates into reduced life cycle costs, a very important factor, that maintain readiness.

Mr. SISISKY. So, that's a pretty important thing in the life cycle cost of an aircraft. Does the Air Force concur?

General RUTHERFORD. Yes, sir, very important to us; reliability and maintainability is near the top of our list in terms of what we are looking for in an NDAA or a C–17 type airplane.

Mr. SISISKY. Thank you very much.

Mr. HUNTER. I thank the gentleman. Let me say, we are going to let the gentleman from New Jersey ask his questions. We have two other elements of this important lift hearing, that is Vice Adm. Philip Quast, who is commander of Military Sealift Command, and Mr. Richard Vortmann, president and CEO of National Steel and Shipbuilding Co.

We may have some questions on the integration here of sealift and airlift for General Rutherford. It will be good to have them here.

Mr. Saxton is recognized. Then we will bring our other two witnesses up.

Mr. SAXTON. Thank you, Mr. Chairman.

I appreciate the Chairman's indulgence. I am going to have to leave. Unfortunately, there are simultaneous hearings and mark ups which are not unusual around here.

In any event, Mr. Kozlowski, it seems to me a year ago we were sitting here in this room and contemplating two issues; whether to spend, I think it was, over $300 million per aircraft and the omnibus settlement.

We were both a part of the same discussion. Fortunately, we got past that. We don't have to talk about the omnibus settlement anymore. It has been successful. You have done what you have said you would with the Air Force. That part of the program is now behind us as far as our policy decision is concerned. Thank goodness. The other side of the coin is a $300 million a copy aircraft that we were talking about a year ago and trying to figure out how to afford it.

I think you just said that the fly away, engine up, ready to go, today you project if we buy eight a year it is $210 million?

Mr. KOZLOWSKI. Two hundred ten to $220 million.

Mr. SISISKY. That is very significant.

Did I also understand correctly that you indicated that one way to get the price down even more significantly is for us to contemplate increasing the number that we buy per year?

Mr. KOZLOWSKI. Increasing it to a reasonable rate. The rates that we all talked about two years ago when we were discussing the omnibus settlement would take another $25 million out of that cost.

Mr. SISISKY. What would be the comparable price; $210 to $220 million if we buy eight? What is the comparable price if we buy 15?

Mr. KOZLOWSKI. In round numbers, around $190 to $200 million for a full-up C–17.

Mr. SISISKY. Thank you. You have brought this program a long way. We want to acknowledge your success. Thank you for doing what you said you would do.

General Rutherford, I would like to pursue, if I may for just a minute. The initial deployment scenario with regard to the type of equipment that we need to get into the theater obviously goes without saying that the speed and dispatch that we are able to get that equipment there is important.

I saw a briefing about a year ago down at Charleston. I was quite impressed with our projected capability with the equipment that we currently have on-line. That was before we were doing any lift with C–17. They were there, some of them, but we weren't using them.

It compared the C–5, C–141, and the commercial capability that we have and it laid on top of that two other lines, one with an NDAA mixed buy and one with a C–17 buy. Can you discuss that scenario with us; how quickly we need to get there? What gives us the best capability of doing that initial mobilization and deployment scenario?

Mr. KOZLOWSKI. Yes, sir. I am not familiar with the briefing that you saw at Charleston. I can't get into specifics with that one. As I indicated earlier in a situation where we need to deploy forces rapidly, airlift is the only game in town.

The initial forces that move out or personnel to marry up with pre-positioned equipment, if you happen to have pre-positioned equipment in the area that you are proceeding to; and we were also talking about equipment, as I mentioned earlier, that cannot be pre-positioned.

Communications equipment doesn't sit in the bottom of a ship very for long periods of time. Sophisticated missile systems do not sit in the bottom of a ship very well for a long time. Helicopters do not sit in the bottom of a ship for a very long time. A tank is a good pre-positioned candidate because it is heavy. It is not deficient to move by airlift.

The airplanes that we are talking about today are both good airplanes. I think what I hear from the Boeing proposal is that by strengthening floors and widening the doors on those airplanes that you can carry some of that equipment that we had previously called oversized equipment.

Oversized equipment is the kind of rolling stock that you saw in front of the airplane here. The outsized equipment is another issue. That has before been defined as that kind of equipment that would only fit in a C–5, or in this case a C–17 because the C–17 was built very similar.

I don't know that we have any outsize capability designed into the 747 that we are picturing here. I wouldn't think so; maybe a little bit of a current—that we call outsized might be able to fit in the airplane depending on the design.

Generally speaking, we are talking about all outsized equipment being moved by the C–5 and the C–17, but maybe some in the 747 and the oversized equipment being moved by C–5's, C–17's, 141's, as long as they are around, and the 747's as I understand it.

Mr. SISISKY. Thank you. Let me ask one final question, Mr. Chairman. It appears that there is a scenario where we could buy C–17's for $190 million or thereabout. The gentleman from Hughes indicated that the fly away cost, unmodified, of the 747 is $156 million. I think you said that it might be in the neighborhood of 10 percent to retrofit certain items. Is that fair?

Mr. KOZLOWSKI. It wouldn't be retrofit. Sir, they would be done in line with the normal production.

Mr. SISISKY. I'm sorry. I'm using—changes that need to be done. The 747 fly away for military purposes could be in the neighborhood of $170 million.

Mr. KOZLOWSKI. Depending on the number purchased and the time; lots of factors.

Mr. SISISKY. Yes, sir. General Rutherford, we are now looking at a possible scenario where we have got an airplane that we can buy that does some pretty neat things for $190 million or a 747 that we could buy for $170 million, with certain characteristics that make it possible to carry certain military items.

Let me ask you a couple of questions. Somebody wrote me a letter not long ago and said, you will never fly one of these C–17's into a theater, into a hot airfield because it is too expensive and you would never take that chance.

We are now looking at two airplanes within $20 million of each other, potentially. Which airplane would be safer to fly into that hot airfield that my constituent talked about?

General RUTHERFORD. Sir, I don't want to take sides. They are both good airplanes.

Mr. SISISKY. General, let me ask you some specific questions here. Mr. Kozlowski indicated that his airplane could fall out of the sky, meaning it has a very steep descent, don't have to have a long glide path to get the airplane into the airfield. Is that correct?

General RUTHERFORD. Yes, sir.

Mr. SISISKY. Is the same characteristic true of the 747?

General RUTHERFORD. I have not flown the 747. I have not evaluated it in that mode, nor in the proposal that they are presenting. What I am saying is what you saw here today is as much as I have seen on the 747–400 to-date.

We are about to go out with a request for a proposal. Boeing will come in and say, this is what my airplane can do. Until we get that request for proposal, we really can't evaluate what we are talking about. I don't know what is contained in those dollars.

Mr. SISISKY. Let me ask you another question.

I understand that the C–17 has redundant systems. Let me ask the gentleman from Hughes, would the 747 have redundant systems?

Mr. EVATT. Sir, I represent Boeing.

Mr. SISISKY. I'm sorry. I did that twice.

Mr. EVATT. I don't want to give Hughes a bad name.

Mr. SISISKY. Yes, sir. I'm sorry about that. I apologize. Does the 747 have redundant systems?

Mr. EVATT. Yes, sir, but I can't give you a comparison in terms of redundancy between these two aircraft because I simply don't have the visibility into the C–17 system.

Mr. SISISKY. Mr. Kozlowski, is it your understanding that the 747 has the same type of redundant systems that you all built into the C–17?

Mr. KOZLOWSKI. I hate to plead ignorance, but I'm not that familiar with the 747 architecture. In certain critical flight control areas, they might be comparable. In other parts of the system, I have no knowledge.

Mr. SISISKY. Good question for us to find out. I would think that redundant systems might have something to do with the safety of getting into a hot airfield.

General RUTHERFORD. I might add, sir, that one thing that we are doing with the C–17, not that we couldn't do it with a 747–400, we would just evaluate what we are doing. We are doing it with a C–17. We are putting an air defense capability on the C–17; a flyer detection capability, which you don't normally see on a commercial airliner.

For example, our CRAF airplanes do not have that capability today, sir. So, we have taken that note. You are right in the sense that we have designed certain features in to the C–17 to make it less vulnerable to threats in a hot environment.

Mr. DELLUMS. Would the gentleman yield briefly to me?

Mr. SISISKY. I would be happy to yield. I have to excuse myself at the same time, if it is all right with the Chairman.

Mr. DELLUMS. It is important for you to stay for just a moment because we are using figures here that I think we need to clarify.

The only figure that is important to the two of us is the figure that the taxpayers pay.

I am sure that the gentleman is aware of the fact that in the fiscal year 1996 budget, the request is for 8 planes. The figure in the budget is $2.5 billion. Simple mathematics means that we are talking $300 million per copy; not $180 million, not $190 million, but $300 million per plane.

The figure that is being given to you at this point, in the context of this hearing, does not include overhead costs; does not include the parts that the government provide, et cetera, et cetera.

So, I think that we are using numbers that it is not fair to use those numbers to compare. What you and I are dealing with is $300 million per plane. Otherwise, the budget request would be $1.5 billion, not $2.5 billion.

The second observation I would make before the gentleman leaves, and I hope that in the context of this hearing we can draw this out. As I understood, and I'm going to ask the gentleman at the appropriate point, it seems to me that the gentleman who represents Boeing was not attempting, and maybe this gentleman is totally off base, but was not attempting to make a presentation to compete with the C–17. He was making presentation that talked about a complimentary aircraft and a total airlift requirement capability. That's a very different thing.

Putting the 747 in a competition in this hearing with the C–17 belies the reality of why we ought to be here. I don't think that that's what the gentleman's presentation was all about. Maybe he is talking about a replacement for the 141, which might be something we can consider with the 747, but not in competition with the C–17.

I think to put the two gentlemen in—position I think is inappropriate at this point. So, those are the two observations I would make. The figures are not the figures we are dealing with. We are dealing with $300 million, gentlemen and lady. That is the correct figure. We need to stay on top of that.

No. 2, it seems to me we should not have these two gentlemen put in a position where they have to compete with each other because that is not the thrust of either of their presentations.

Mr. SAXTON. Yes, sir, Mr. Chairman, may I just respond to the first point. I agree with Mr. Dellums with regard to the $300 million a copy, 1986 buy. There is no question about that.

I have been told, I think—I think I have been convinced that that's going to go forward. There is no attempt on anybody's part to change the 1986 buy. However, what this hearing is also about is a pattern of leading up to a decision that the gentleman, I, and all of the other members of this committee are going to have to make in November.

Certainly, the subject of whether we are going to spend $300 million a copy or $190 million a copy, or $170 million a copy is very, very relevant to the taxpayers that the gentleman referred to.

Mr. DELLUMS. The judgment in November, it seems to me, will be the mix and the compliment. That's what my comments were simply designed to point out.

Mr. HUNTER. Let the Chair just observe that both gentlemen have a good point. I think that if we ask General Rutherford are

you willing to take $190 million times 8 and have that the fiscal year 1996 buy, your answer is no. Is that right, General Rutherford?

General RUTHERFORD. Yes, sir. That's correct.

Mr. HUNTER. On the other hand, I think the gentleman from California makes an excellent point. So, we were mixing some apples and oranges here. That is what this hearing is about. The gentleman from New Jersey is correct in this sense.

While we don't need to have a competition between the aircraft, there are obviously two competing plans out there. One plan is a complimentary plan that the gentleman speaks about and the other plan is a plan that doesn't involve a complimentary force.

So, I think we are moving along pretty good here. I hate to complicate this mix, but General Rutherford has spoken. He is head of transportation, meaning airlift and sealift. He has spoken about some of the decisions that we are going to make in terms of purchasing aircraft are going to be made in the context of evaluating how much sealift we have and how quickly that sealift is going to move equipment to theater.

I want to ask our two sealift panelists to come up, let them testify and then we are going to open up the whole panel for the remaining questions for the committee.

If the gentlemen who are there could just move over, but hang tough. Don't go anywhere. We will ask Vice Adm. Philip Quast, the commander of Military Sealift Command and Richard Vortmann, president and CEO of National Steel and Shipbuilding to come up and let them make a presentation here.

Then we will ask all of the panelists to be available for questions here.

Mr. LONGLEY. Mr. Chairman, I have to attend a mark up in another committee. I just want to state for the record that I am hoping to be back here to ask some questions. If not, I would ask to submit questions for the record.

Mr. HUNTER. Certainly. All members will be allowed to submit questions for the record and all witnesses will be asked to respond to those questions that are submitted for the record.

[The following information was received for the record:]

Mr Watts: The topic of strategic airlift is of great concern to me. I am deeply troubled that this country may not have the strategic airlift needed to fight and win on the battlefield of tomorrow. The press have suggested that the Air Force is "lukewarm" in making a commitment to the Non-Developmental Airlift Aircraft and, at this time, I believe that is the correct strategy. But I'd like to spend a moment and try to focus on C-17. My question is, if the Air Force decides on a force mix of C-17s and/or non-developmental aircraft, what are some of the possible numbers that may come from that decision? How many C-17s are needed to deliver troops, tanks, and other equipment to the forward area of the battle?

General Hawley: The Mobility Requirements Study Bottom-up Review Update (MRS BURU) airlift requirement is for 49-52 million-ton-miles per day (MTM/D) which equates to 120-140 C-17 equivalents. The Strategic Airlift Force Mix Analysis (SAFMA) and the Defense Acquisition Board (DAB) will consider various airlift fleet mixes with the C-17 breakpoints at 40, 58, 72, 86, 100, 120, 132, and 141 aircraft. While the total MRS BURU airlift requirement is important, what is delivered in the first few weeks of a Major Regional Contingency (MRC) is critical. The C-141, C-17, and C-5 can carry oversize cargo, which comprises 64% of the required equipment in the first 30 days. Only the C-17 and C-5 , however can carry outsize cargo (tanks, missile systems, helicopters), which is 11% of the requirement in the first 30 days. The SAFMA will determine the number of aircraft by type needed to carry the over/outsize cargo to effectively close the force. It will be completed in time for the DAB Milestone III review in Nov 95.

MPS SHIPS

Representative Saxton: Is it your opinion that MSC can purchase MPS ships using the NDSF without additional authorization from Congress?

VADM Quast: The Navy is committed to the purchase of the five MPS ships now operated by a subsidiary of General Dynamics. Although General Dynamics doesn't own the ships, they have a long term operating contract which contains extraordinary profits. In the current budgetary environment the Navy cannot continue to fund these profits. Buying the ships and recompeting the operating contract will save almost $1 billion over the next fifteen years. These savings are net of ships' purchase price.

One possible source of purchase funds is from the unobligated balances of the National Defense Sealift Fund. These funds would only be used with the understanding that the purchase would have no disruptive effect on the LMSR program, and that any funds would be fully restored to the fund through subsequent appropriations or reprogramming.

The Navy is currently exploring various alternatives to accomplishing the purchase of those five ships and is expected to have a position in the near future. Specific answers to each of the questions posed are dependent upon the final Navy determination in this matter.

Representative Saxton: The purchase of MPS ships is a major expenditure of DoD Acquisition funds that does not appear as a line item anywhere in the Presidents Budget. Why is the MPS ship acquisition not a separate line item identified in the NDSF Budget?

VADM Quast: The Navy is committed to the purchase of the five MPS ships now operated by a subsidiary of General Dynamics. Although General Dynamics doesn't own the ships, they have a long term operating contract which contains extraordinary profits. In the current budgetary environment the Navy cannot continue to fund these profits. Buying the ships and recompeting the operating contract will save almost $1 billion over the next fifteen years. These savings are net of ships' purchase price.

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Representative Saxton: What order of magnitude cost will MSC pay to acquire the MPS Ships? When will these funds be expended?

VADM Quast: The Navy is committed to the purchase of the five MPS ships now operated by a subsidiary of General Dynamics. Although General Dynamics doesn't own the ships, they have a long term operating contract which contains extraordinary profits. In the current budgetary environment the Navy cannot continue to fund these profits. Buying the ships and recompeting the operating contract will save almost $1 billion over the next fifteen years. These savings are net of ships' purchase price.

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Representative Saxton: The Navy Highlight Book says"...the Department will begin to purchase these vessels from current unobligated balances in the fund." How much current unobligated balances are there in the fund? If this amount does not cover the entire purchase price of the MPS ships, where will MSC obtain additional funds?

VADM Quast: The Navy is committed to the purchase of the five MPS ships now operated by a subsidiary of General Dynamics. Although General Dynamics doesn't own the ships, they have a long term operating contract which contains extraordinary profits. In the current budgetary environment the Navy cannot continue to fund these profits. Buying the ships and recompeting the operating contract will save almost $1 billion over the next fifteen years. These savings are net of ships' purchase price.

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Representative Saxton: The Navy Highlight Book says "If this action is taken, additional funding must be identified for financing the full-funding requirements of the prepositioning/surge ships under contract." What does this sentence mean? When you say the "ships under contract" do you mean the unexercised options or do you mean the ships under construction today?

VADM Quast: The Navy is committed to the purchase of the five MPS ships now operated by a subsidiary of General Dynamics. Although General Dynamics doesn't own the ships, they have a long term operating contract which contains extraordinary profits. In the current budgetary environment the Navy cannot continue to fund these profits. Buying the ships and recompeting the operating contract will save almost $1 billion over the next fifteen years. These savings are net of ships' purchase price.

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Representative Saxton: Where do you expect to get the "additional funding?" If you expect to get it from "savings" from lower MPS O&M cost, aren't you counting on getting O&M funds that haven't been appropriated yet? (For example, if Marine Corps O&M cost for MPS ships in FY 98 were expected to be $100 million, but because you purchase the ships in FY 96, Marine Corps O&M is only $30 million, Congress would not appropriate $100 million in FY 98 to cover $30 million in cost plus $70 million in savings to pay back the NDSF. Congress would only appropriate $30 million and the NDSF would be out $70 million.)

VADM Quast: The Navy is committed to the purchase of the five MPS ships now operated by a subsidiary of General Dynamics. Although General Dynamics doesn't own the ships, they have a long term operating contract which contains extraordinary profits. In the current budgetary environment the Navy cannot continue to fund these profits. Buying the ships and recompeting the operating contract will save almost $1 billion over the next fifteen years. These savings are net of ships' purchase price.

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LMSRs

Representative Saxton: We were pleased to hear you state that the acquisition of the new construction LMSRs is your highest priority. You stated that dollars appropriated would go first to that program. Doesn't this conflict with the statement in the budget highlight book that additional funding will be required to fully fund these ships?

VADM Quast: The Navy is committed to the purchase of the five MPS ships now operated by a subsidiary of General Dynamics. Although General Dynamics doesn't own the ships, they have a long term operating contract which contains extraordinary profits. In the current budgetary environment the Navy cannot continue to fund these profits. Buying the ships and recompeting the operating contract will save almost $1 billion over the next fifteen years. These savings are net of ships' purchase price.

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The Navy is currently exploring various alternatives to accomplishing the purchase of those five ships and is expected to have a position in the near future. Specific answers to each of the questions posed are dependent upon the final Navy determination in this matter.

Representative Saxton: The Navy Budget Highlight Book calls for the acquisition of two new LMSRs at $596 million and two or three used RO/ROs for the RRF at $70 million. But the President's Budget Request only has $288 million in FY 96 for Sealift Acquisition (page 349). Please reconcile these numbers.

VADM Quast: The FY 1996 President's Budget requests $974.2 million for the National Defense Sealift Fund. This provides $280 million for the operations and maintenance of the existing RRF fleet, $70 million for additional RRF ship acquisition, $2.0 million for continuation of research and development efforts for the Merchant Ship Naval Augment Program, $17.1 million for Strategic Sealift Technology Development Program, and the balance of $596 million for the acquisition of two new construction LMSR ships. The $288 million figure represents FY 1996 projected obligations not the FY 1996 budget request.

Mr. HUNTER. Vice Admiral Quast, you have had a chance to listen to a little bit of the discussion about what we need to move, how quickly, and what we can do in terms of moving things by air. Please give us the from the sea perspective.

Admiral QUAST. Yes, sir. Thank you.

STATEMENT OF VICE ADM. PHILIP M. QUAST, COMMANDER, MILITARY SEALIFT COMMAND

Admiral QUAST. Thank you very much, Mr. Chairman and distinguished members of the Procurement Subcommittee.

I am pleased to have this opportunity to express my support for that part of the President's fiscal 1996 budget dealing with strategic sealift.

The Military Sealift Command has three global missions. First, we move all of the Department of Defense's cargo that goes by sea.

Second, we provide combat ready logistic forces for our native fleet around the globe.

Finally, we provide reliable special mission ships for a variety of Government agencies.

On any given day MSC has more than 130 ships. In fact, today, we have 139 ships fulfilling these diverse missions, which we call logistics from the sea.

The movement of all DOD cargo that travels by sea is accomplished by MSC as a Navy component commander for TRANSCOM. General Rutherford is my boss.

Ninety-five percent of all Department of Defense requirements are met by sea transportation. The Department of Defense requirements for strategic sealift can be broken down in three categories: pre-positioning or [PREPO], surge, and sustainment.

PREPO ships provide for deterrence and initial rapid response in the event of a crisis.

Surge sealift involves the immediate transportation of heavy military equipment from CONUS, or Continental United States, using specialized roll-on/roll-off, or RO/RO, type ships to the theater of operations.

Sustainment sealift follows and keeps our forces armed, fed supplied. We rely principally on commercial intermodal liner service for sustainment. In the most recent operation in the Caribbean with Haiti, as well as Desert Storm, 95 percent of the logistics came by sea.

We have 32 ships meeting our pre-positioning requirements. That is PREPO. The 13 MPS, or maritime pre-positioning ships are divided into three squadrons and are permanently deployed forward. In fact, tomorrow one arrives in the Mediterranean, Spain, for its permanent positioning in the Mediterranean.

One is in the Diego Garcia and the third is in the Western Pacific, Guam, and Saipan. Each of these three squadrons is loaded with U.S. Marine Corps equipment and supplies to sustain a Marine Expeditionary Brigade. That is about 17,000 Marines for a period of 30 days. The AWR–3 ships, that is the Army War Reserve, afloat, 12 ships, were created as a result of a congressionally mandated Mobility Requirements Study of 1992.

These ships carry heavy brigades, combat equipment, and the associates supporting units, as well as sustainment materials to support Army forces.

The remaining seven pre-positioning ships carry aviation ammunition for the Air Force, a fleet hospital for the Navy, and fuel for the Navy and the defense logistics agencies.

Surge sealift assets are located on the East, West, and Gulf Coast of the United States. Their purpose is to rapidly load and delivery combat equipment from the United States to the theater of operations.

Eight fast sealift ships are the key part of our current rapid surge capability. These national assets each have a cargo carrying capacity of 150,000 square feet and, all combined, are embarked to support early deploying Army mechanized units.

Our RO/RO's, roll-on/roll-off ships, are also maintained in a 4-day status to quickly move combat equipment to the theater if required. Twenty-nine other ready reserve fleet [RRF] ships are kept in a lower state of readiness for the surge effort.

Ships for the purpose of sustaining our combat forces are largely drawn from the U.S. flat merchant fleet. Container ships and tankers are the primary types of ships needed for sustainment.

The document that defines our strategic sealift requirements is that mandated Mobility Requirements Study. It was validated by the recently signed bottom-up review update. It determined that the Department of Defense needed additional PREPO and surge shipping.

Specifically, DOD was to add 3 million square feet of surge shipping and 2 million square feet of PREPO shipping. This translated to 19 large medium speed roll-on/roll-off ships, referred to as LMSR; 11 of those for surge and 8 for PREPO.

Responding to the recommendation for two container ships, MSC just recently signed, last month, two long term up to 50, 1-month charters for two container ships, which are expected to be on station in May, June of this year.

Finally, the MRS Mobility Requirements Study recommends 19 additional RO/RO ships for the RRF.

This is how we plan to acquire ships to meet our surge shipping requirements. The dip in fiscal year 1995 was the result of having a request for $250 million in maintenance funds cut by $100 million, as General Rutherford referred to in his statement.

The increase in capability from 1996 through 2001 is due to three factors. First, the addition of 11 of the 19 LMSR's dedicated to surge, which comes out of our $5.8 billion construction program.

Second, the additional five RO/RO's to be added to the RRF. Finally, increased readiness which includes partial crewing of the RRF ships.

Our $5.8 billion new ship construction and conversion program for the large medium speed RO/RO's is enjoying support from the Congress and is progressing. Eleven of those nineteen ships have been funded.

We are asking for the appropriation for two more in the fiscal year 1996 budget.

The Mobility Requirements Study directed that DOD acquire 19 more of these roll-on/roll-off for the RRF. We have already pur-

chased 14 of that number. We need to acquire five additional RO/RO's. This program has not had the same level of support from Congress that is provided for the LMSR's.

Last year, for the current fiscal year, $158 million which was previously appropriated for this purpose was rescinded.

The President's budget request of $596 million for LMSR numbers, No. 12 and 13, as well as $70 million for the purchase of up to three more RO/RO's for the RRF——

Mr. HUNTER. Admiral, is this the foreign haul issue?

Admiral QUAST. The RO/RO's.

Mr. HUNTER. For the members, could you explain that just a little bit what we did here?

Admiral QUAST. Yes, sir. We are out to satisfy the requirement of 19 total additional RO/RO's for the RRF; 14 of which have already been purchased. We are buying essentially ships that are already on the market at the best cost that we can get them. Right now in the U.S. fleet market, we are looking at just a handful of RO/RO's that are in existence, two of those handful we have already chartered that we are using today.

So, they are not readily available for purchase. When we go in to buy, what we are typically looking at are foreign RO/RO ships. The $70 million is adequate to buy either two or three, depending on the price. If we get two, that $70 million should cover not only the purchase of the ships, but bringing them up to U.S. standards.

We ask for your support of these programs to ensure that we can get the capacity that we need to support the military strategy.

That's all I have. I appreciate the opportunity, sir.

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MILITARY PROCUREMENT
SUBCOMMITTEE OF THE
HOUSE COMMITTEE ON
NATIONAL SECURITY

STATEMENT FOR THE RECORD

VADM PHILIP QUAST

COMMANDER

MILITARY SEALIFT COMMAND

BEFORE THE MILITARY PROCUREMENT SUBCOMMITTEE

OF THE

HOUSE COMMITTEE ON

NATIONAL SECURITY

30 March 1995

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Good afternoon, Mr. Chairman and Members of the Panel. I am Vice Admiral Philip M. Quast, Commander of the Military Sealift Command. It is my pleasure to have the opportunity to appear before you today to discuss strategic sealift.

Mission

The Military Sealift Command (MSC) has three missions which are global in nature. MSC provides efficient sea transportation; combat ready logistics forces; and reliable special mission ships for the Department of Defense in peace and war.

Our focus today will be on the sea transportation part of our mission, which is accomplished as the Navy Component Commander for the United States Transportation Command. Strategic sealift assets are used to provide efficient sea transportation for this purpose.

Requirements

DoD requirements for strategic sealift can be broken down into three components: prepositioning, surge and sustainment. Prepositioning provides for deterrence and initial rapid response in the event of a

contingency. Surge sealift involves the immediate transportation of heavy military equipment from the continental United States, using specialized roll-on roll-off vessels, to the theater of operations. Sustainment sealift follows and keeps our forces armed, fed and supplied, relying primarily on commercial intermodal liner service. All three components have been employed during the current fiscal year (FY95).

Afloat Prepositioning Forces

The afloat prepositioning concept was developed in the late 1970s through the early 1980s. The Navy and Marine Corps deployed the Maritime Prepositioning Force in the 1985-6 time frame, beginning an aggressive program to forward deploy afloat combat equipment.

Currently, 13 Maritime Prepositioning Ships, divided into three squadrons, are forward deployed. The squadrons are located in the Mediterranean, Diego Garcia, and the Guam/Saipan area. Each squadron is embarked with U.S. Marine Corps equipment and supplies to sustain a Marine Expeditionary Force (MEF) (Forward)(up to 17,300 Marines) for 30 days. These ships are roll-on/roll-off (RO/RO) ships and were the

first sealift ships on-scene during Operations Desert Shield and Restore Hope. Outfitted with large, modernized cargo cranes, stern ramps and a helicopter pad (CH-53 helicopter capable), these ships are tailor made for rapid load and off-load either pierside, or instream to lighterage during Logistics Over the Shore (LOTS) operations.

Each MPS Squadron is spread loaded with a MEF (Forward's) worth of equipment and supplies to ensure that no single warfighting capability is lost through combat attrition. Each squadron also has configured its cargo so that one ship can support a Marine Expeditionary Unit (MEU)(2,200 Marines) and two ships can support a Marine Expeditionary Brigade (MEB) in Low Intensity Conflict (LIC).

Congress provided the Navy $110 million in FY95 to acquire one additional RO/RO ship to enhance current MPS capability. This additional ship will allow the Marine Corps to incorporate a Joint Task Force/Marine Force Forward Headquarters, a naval fleet hospital, an Expeditionary Airfield, a Naval Mobile Construction Battalion, and additional Table of Equipment

restoration and sustainment, otherwise requiring critically short strategic airlift.

The Army has developed a comprehensive program (Army War Reserve (AWR)) of prepositioning, both ashore and afloat, in response to the Congressionally Mandated Mobility Requirements Study (MRS). Crucial to this concept has been the afloat prepositioning program (AWR-3), which when fully deployed will consist of combat equipment for a heavy brigade, equipment for combat support and combat service support units, and the critical sustainment to support the Army force until sea lines of communications are established to bring supplies from the United States to the theater of operations. This force is self-supporting, with port opening and material handling equipment necessary to operate in austere ports or to conduct limited Logistics Over the Shore, if necessary.

Currently, the twelve ships forward deployed are under the administrative control of the respective MPS Squadron Commanders at sites in Guam/Saipan and Diego Garcia. The AWR-3 fleet includes seven RRF RO/ROs that were activated and loaded with combat equipment for a

heavy brigade and its supporting units. The seven ships provide 800,000 square feet of prepositioning capacity (40 percent of the MRS recommendation), and will be replaced by the large medium-speed RO/ROs (LMSR), as they begin to come on line in FY96.

MSC has chartered two container ships to be added to the AWR-3 fleet. After reflagging and refitting, these ships are loading cargo in Charleston, S. C., and are expected to be on station in Guam in May-June 1995.

Similar to the MPS, all of the AWR-3 ships will go through a periodic maintenance cycle. Equipment and supplies will be maintained or rotated at Charleston, S.C., and Concord, Calif. Concurrently, the ships have scheduled maintenance completed in U.S. shipyards.

Additional Afloat Prepositioning Ships are located at Diego Garcia and in the Mediterranean that support the Air Force, Navy and the Defense Logistics Agency. The Air Force has one breakbulk ship in the Mediterranean Sea and one breakbulk ship and one barge carrying ship in the Indian Ocean, with approximately 98 percent of the cargoes being aviation ammunition. Three fuel tanker ships support the Navy and the

Defense Logistics Agency, including the two Offshore Petroleum Discharge System (OPDS) capable ships, capable of mooring offshore as much as four miles and delivering to on-shore fuel farms. Additionally, one heavy lift ship has a 500 bed Navy fleet hospital to support contingency requirements. All of the aforementioned ships operate under the control of MSC.

Surge Shipping

Eight Fast Sealift Ships (FSS) are the key part of our current rapid surge capability. These national assets each have a cargo carrying capacity of 150,000 square feet and, all combined, are earmarked to support early deploying Army mechanized units.

The FSS are the fastest and most capable of our current sealift assets. Since their acquisition in the early 1980s, these eight ships have been layberthed in ports on the East and Gulf Coasts. All eight ships have partial crews aboard which enable them to be activated and on berth ready to load in 96 hours or less.

The 22 RRF RO/ROs in ROS-4 and the 29 other multipurpose RRF ships in 10 and 20 day status that are

available for surge deployment round out our current surge capability. The combined capacity of the current surge fleet falls five million square feet short of DoD's requirement for 10 million square feet of surge sealift.

Sustainment

We currently can draw sizeable sustainment support from the U. S. flag merchant fleet. The majority of our U. S. flag shipping are container ships. Additionally, we can draw from the Effective U. S. Controlled (EUSC) fleet, approximately 41 container, RO/RO, and breakbulk ships which are U. S. owned.

We can obtain the use of U. S. and foreign commercial shipping by booking liner service from continental U. S. to overseas ports. We can also charter for foreign flag ships when U. S. flag ships are not available, as we did during the Gulf War.

Additionally, the remaining RRF ships in 30 day readiness status are also available to move sustainment cargo for DOD.

Current Acquisition Programs

The future of DoD's prepositioning and surge sealift programs depends upon the LMSRs and the acquisition of the additional five RO/ROs for the RRF. Following the Persian Gulf War, the 1992 MRS established the requirement for increased strategic sealift capability. The study cited the need for an additional five million square feet of cargo space for surge and prepositioning, equivalent to 19 LMSR ships. A second recommendation was that an additional 19 RO/ROs be added to the RRF to bring the RRF RO/RO inventory up to 36.

LMSR Deliveries

In order to meet the MRS goal by 2001, the Navy is converting five former commercial container ships to LMSRs and has six other vessels funded and under contract for new construction. An additional six vessels are under contract option for construction. New contracting actions for the final two of the 19 LMSRs has not been taken. All will be operated by MSC.

The five converted LMSRs will range in length from 907 to 954 feet. Each conversion ship will provide

cargo capacities between 310,000 and 332,000 square feet, and sustain speeds of 24 knots. Shipyard contract award costs for converting the vessels are $426 million at Newport News Shipbuilding for two ships and $635 million at National Steel and Shipbuilding Co. for three ships. An additional $46 million was spent to supply Class Standard Equipment (e.g., shipboard cranes, ramp systems) to these five conversion ships.

In 1993, design and new construction contracts were awarded to Avondale and National Steel and Shipbuilding Co. Each company was awarded a contract for one LMSR with options for five additional ships. To date, the Navy has exercised options for two ships at each shipyard, bringing the total new-construction ships to three for each yard. These ships will be 950 feet in length and provide between 390,000 and 397,000 square feet of cargo space, and will be capable of maintaining a speed of 24 knots. The lead Avondale ship will be named USNS Bob Hope, after the entertainer who has provided 50 years of support to U. S. military forces worldwide

Ready Reserve Force

The Ready Reserve Force (RRF) is used to meet our requirements in prepositioning, surge, and sustainment. Currently, there are 10 RRF ships used for prepositioning. Seven RO/ROs are being employed in the AWR-3 program in an interim capacity, until replaced by conversion and new construction LMSRs; one crane ship to support contingency operations in locations where pierside cranes may not be available; and two are OPDS tankers supporting contingency requirements for DLA. To fulfill part of DOD's surge sealift requirement, the RRF contains 22 additional RO/RO ships in a four-day readiness status with small crews aboard. These 22 ships can rapidly load heavy Army and USMC wheeled and tracked vehicles. Twenty nine other ships are maintained in a 10 to 20-day readiness status and will meet other aspects of the surge requirement such as the Afloat Follow on Echelon (AFOE) for the Marine Corps and the Combat Logistics Force (CLF) for the Navy. The remaining 29 ships are maintained in a 30-day readiness status.

RRF Readiness

In FY95, RRF O&M funding, which was a part of the Department of Transportation (DoT) funding process, was reduced by $100 million from the President's budget request of $250 million for O&M. This forced us to make significant changes in force size, maintenance, and readiness status in order to focus limited funds on our most capable and critical ships. Specifically, while maintaining our 22 RO/RO ships at 4-day readiness, we reduced the readiness and maintenance on 29 other high priority vessels, placed an additional 29 vessels in a minimal-maintenance 30-day readiness status, and transferred 13 vessels to the National Defense Reserve Fleet, effectively removing these last two categories of 42 ships from our surge shipping capacity. This loss equates to approximately 1.7 million square feet of capacity, exacerbating the current shortfall of surge shipping. The reduction of 1.7 million square feet is somewhat greater than one heavy division during an initial deployment. Accordingly, a loss of this dimension is significant and severely degrades our current sealift posture. It

is therefore of critical importance to restore to appropriate levels the maintenance funding of the RRF to ensure adequate and responsive surge capacity to the current RRD. The RRF funding situation contributed to our being five million square feet short of DoD's goal of 10 million square feet for surge sealift by 2001.

Additionally, $158 million of prior years' appropriations, available for purchase of additional RRF RO/RO ships to meet the goals of the MRS, was rescinded. Two additional RO/RO ships were recently purchased for the RRF with the $43 million appropriated to DoD in FY95. These ships will be upgraded to a ROS-4 readiness level as additional funds become available. To enhance the justification for our capital RRF budget request, the administration, beginning with 1996 budget transferred funding responsibility from DoT to DoD.

FY 96 NDSF Budget Request

We consider it essential to the improvement of our national sealift capacity to maintain the pace by supporting the current funding levels in the President's Budget for the National Defense Sealift Fund. The LMSR program needs the $596 million to

exercise contract options for two more new construction LMSRs, maintaining the impetus of the LMSR program.

. We need the $289 million for O&M funding of the RRF to maintain the readiness of the RRF surge assets and to restore the readiness levels of the ships affected by the FY95 funding cuts.

. We still need to acquire five more RO/ROs for the RRF to meet the DoD's goal of 36 RO/RO ships. The FY96 budget includes $70 million for RRF RO/RO acquisition.

Summary

The Navy's strategic sealift programs have historically supported the U. S. maritime industries, benefiting enormously from the industry's quality work and responsive efforts. The LMSR construction and conversion program represents an investment of almost $6 billion in a partnership with U. S. shipyards and support industries. Seventy of the 92 ships of the RRF were purchased from U. S. owners and provided them with the necessary capital to reinvest in the industry. All were refitted by U. S. shipyards and are maintained in

U.S. facilities, providing millions of dollars to the ship repair industry.

Strategic sealift programs are more important today than they have ever been. As U.S. forces return home from overseas bases, the ability to quickly deploy a credible military force has become the centerpiece of the National Military Strategy. The RRF is a critical component of our strategic sealift force, comprising 75 percent of today's organic surge capability and will still represent over 50 percent of our surge sealift capability when the entire program is in place in 2001. We need your continuing support of the RRF and LMSR programs to ensure that we acquire and maintain the capability to support the unified commanders in chief in theaters of operation around the world.

Mr. HUNTER. Thank you very much, Admiral Quast.

Now, from the industry side, Mr. Richard H. Vortmann, an old friend, chairman and CEO, National Steel and Shipbuilding Co. Dick, you have heard the requirements and the blueprint for achieving the requirements. What's the story?

STATEMENT OF RICHARD H. VORTMANN, CHAIRMAN AND CEO, NATIONAL STEEL & SHIPBUILDING CO.

Mr. VORTMANN. Mr. Chairman, first I want to express our appreciation for the opportunity to share our thoughts with this committee.

I am Dick Vortmann, chairman and chief executive officer, National Steel and Shipbuilding, NASSCO. I am located in San Diego, CA. Let me first say, Mr. Chairman, I, on behalf of all of the 4,000 employee-owners of NASSCO, want to express our appreciation for your long and steadfast support of the shipbuilding industry.

Mr. HUNTER. That's a take. Give me that film clip.

Mr. VORTMANN. As CEO of NASSCO, I also serve on the board of directors of the American Shipbuilding Association or the ASA, which is the new trade association consisting of our Nation's six largest private shipbuilding yards.

These are the six shipyards that essentially build all of our Nation's complex combatants and large amphibious and auxiliary ships, including the sealift ships that we have mentioned already today.

These six shipyards employ over 90 percent of the workers in the U.S. shipbuilding industry. NASSCO is a long time builder of U.S. amphibious and auxiliary vessels and, particularly relevant to this hearing, NASSCO has been a dominant player in the building of the sealift ships for the Navy.

In 1993, we were selected by the Navy to accomplish both the conversions and the new building contracts for this current strategic sealift program. In addition to our work with the Navy, we also have a long history of building commercial ships.

In fact, our past practice and future goal is to maintain roughly a 50–50 split between Navy and commercial building in the yard. My remarks here today are intended to offer the views not only of my company NASSCO, but also to reflect the views of my fellow major U.S. shipyards and members of the ASA.

We believe that the issue of adequate sealift of vital importance to our Nation's ability to project power overseas. Without the foresight exhibited by Congress in the fiscal year 1990 and 1991 budgets which mandated the Mobility Study, the current strategic sealift program might not have become the reality it is today.

I think Desert Storm proved that the RO/RO's are needed to meet pre-positioning, surge, and the sustainment missions that the admiral mentioned. Obviously, they are vital to our national security interest.

However, it has to be recognized that the multipurpose RO/RO as a ship type is fading very rapidly from commercial viability in today's world fleets. More importantly, the transportation requirements of U.S. military equipment, such as self unloading, adequate vehicle maneuverability within the ship, deck strengthening, deck head heights, the high speed of the ships, those requirements often

exceed—typically exceed—the commercial ship standards of the typical car carrier RO/RO in the marketplace.

An M1A1 tank is obviously a different cargo than a Toyota Celica. It is for this reason that Congress recognized the need for a dedicated U.S. fleet of strategic sealift ships. Specifically designed to meet the requirements of this military cargo and being able to land in both developed and undeveloped ports.

The congressionally mandated Mobility Requirements Study dated back in January 1992 established a requirement for the equivalent of 19 large medium speed RO/RO's, the LMSR's the admiral has spoken of.

As he stated, to-date, 17 of those 19 ships are under contract; the 17 ships include 6 which are options awaiting funding from Congress.

Mr. Chairman, we certainly hope that this committee will support the fiscal year 1996 budget request for the next two options, as well as the additional funding in fiscal year 1997 and fiscal year 1998 for the other four option ships.

Additionally, we would also hope that the committee will be able to fund the completion of the original study, which calls for the total of 19 ships. It will require two more ships in addition to the six ships that are under option.

I would also like to share some views on a point that the admiral mentioned and the chairman questioned. That is the Government's practice of procuring existing used foreign flag ships for the Ready Reserve Fleet.

Before I address this, I would like to take just a minute to try to put my opinions in a broader perspective. Our country faces a serious and growing issue with our national defense industrial mobilization base.

It is quite clear that currently the Navy's need for new ships is substantially less than the current naval shipbuilding capacity in the United States. That capacity has already shrunken through yard closures resulting from the fact that our naval fleet is being contracted from 600 ships down to 340 ships.

Private employment in U.S. shipyards was approximately 155,000 people in the late 1970's. Now it is down to 70,000 and it is projected to decline significantly further in the next 3 years as the full impact is felt of this dramatically reduced shipbuilding and conversion, Navy [SCN] budget.

This decline in shipbuilding does not represent an immediate problem for our Navy or our country today. Because of that I feel it is being overlooked or ignored in our Nation's policy priorities with respect to the future.

While it is clear that we have excess shipbuilding capacity today, once our Navy fleet reaches its steady state condition of 340 ships, the simple replacement demand of 10 to 12 ships per year for that size fleet will require much more shipbuilding capacity than will be utilized in the next few years. This shortfall will be much larger if unfolding world events indicate that we have cut our fleet too far and that our 340 ships cannot serve our needs and adequately project U.S. forces.

We must ensure that sufficient shipyard capacity will exist when the Navy does need it. In order to do that, very simply I would sug-

gest, our shipyards need additional volume over the next several years. Volume to replace the declining Navy new buildings.

This much needed additional volume will accomplish two principal things. First, it will hold down the unit cost of the few ships that you will be authorizing for the Navy over the next few years by spreading the shipyard overhead over a much broader base.

Second, this added volume will maintain the existing physical shipyard capacity and the skills of thousands of shipyard workers. Without this additional volume, more U.S. yards will be forced out of business. It must be recognized that typically once a shipyard shuts down, it is not retrievable. Shipyards are typically prime real estate that gets converted to other uses.

The adverse consequences of the declining shipbuilding activity are quite clear. Equally clear is the need for additional volume to prevent it. But what is not clear is how to create that additional needed volume for the U.S. shipyards. The only answer to the "how" that is clear is that the added volume must be commercial ships.

In the past, U.S. shipyards have enjoyed a share of the worldwide commercial marketplace. It is important to note, the worldwide commercial market has never a been a free or a fair marketplace. It never has been and, in my opinion, it never will be.

Governments have always been involved in their country's shipbuilding industries. Our Government was no exception. Essentially all of the commercial shipbuilding in our country in the 1970's was under some form of Government involvement in the marketplace.

When our Government halted its shipbuilding subsidy program in 1981 in a bold attempt to lead the world to free trade by example, the best I can say is it was a noble experiment. The fact is that it utterly failed. No country followed the United States' lead.

In fact, during the period since then, many foreign governments have actually increased their support to their industries in an effort to expand their country's market share.

The Organization for Economic Cooperation & Development [OECD] shipbuilding trade agreement, that was recently negotiated in Paris and that will shortly be brought before Congress, in our opinion is totally flawed and is counter-productive to helping solve the defense industrial problem that we face here in our country. We must look elsewhere for a viable solution.

That brings me back to the issue of the current government policy of acquiring foreign built ships for the Ready Reserve Fleet. I would suggest that as we address such specific issues as these, we should at the same time try to encompass the broader issue.

The broader issue is the future of the shipbuilding industry and its need to support our Navy's needs in the future. As I understand it, the MRS recommended 19 RO/RO's be added to the RRF to achieve a total of 36 RO/RO's.

Based on the most recent acquisition of the two NedLloyd RO/RO's for the RRF by MarAd, this RO/RO fleet expenditure now will amount to about $800 million in acquisition costs alone. If you add to this another annual cost of some $2 to $3 million per year per ship to maintain these ships, over a 10-year period this represents close to a $2 billion investment of the taxpayers' dollars.

The issue in my mind is whether this is a sound expenditure of U.S. taxpayers' dollars, especially when taken in the context of the needs of our U.S. shipyards and their need for further shipbuilding orders to replace declining Navy backlogs.

I believe that this is bad policy and is short-sighted for several reasons. First, U.S. taxpayer dollars are being sent to foreign ship owners. The foreign ship owners are going to use our tax dollars to replace their fleets in foreign shipyards with foreign subsidized ships.

Second, the laying up of ships in the RRF does nothing to provide a pool of maritime labor to man those ships if and when they are going to be needed.

Third, the maintenance cost for the RRF ships is very high.

Fourth, the existing ships in the RRF are aging and will soon need to be replaced. By the time they will need to be replaced, there will be few, if any, RO/RO's remaining in the worldwide fleet. Thus, at some point in time we are going to have to come to grips with an alternative approach to just buying foreign ships to fulfill our Ready Reserve needs.

Fifth, lastly and most importantly from our point of view, the acquisition of foreign ships does absolutely nothing in terms of helping address the problems in the U.S. naval shipbuilding industry.

In my view the ideal solution to this need for a larger RRF is to creatively develop a program which satisfies the need for more ships and at the same time helps address the maintaining of the vital shipyard capacity issue.

One example of such a creative program would have a fleet of active U.S. flat RO/RO's, newly built in U.S. shipyards, needing that volume to replace the declining Navy orders. These RO/RO's would be in active commercial service and could be called upon in times of a national emergency.

Car carriers are still in commercial demand in sufficient numbers. Around the world the fleet of existing car carriers is rapidly aging. Certain defense features, like heavy decks, ramps, adequate head heights, speed, could be designed and built into a conventional car carrier for a relatively modest cost to make it capable of carrying the military rolling stock during emergencies.

Several years ago, as a result of significant congressional pressure, we recall that the Japanese agreed to put four new car carriers under United States flag carrying Japanese autos to the American shores. Unfortunately, back then we did not pursue that those ships would also be built in United States shipyards. As a consequence, they were built in Japanese shipyards.

I believe agreements of this type for a share of international cargos could be reached with our Nation's trading partners if the need was truly based on our national security purposes.

There might well be a better variation on this theme, but this is one approach of obtaining the Reserve Fleet that our Navy needs and at the same time helping to solve the problem that we are going to face in the very near future of not having adequate shipyard capacity to build the Navy's ships that are going to be needed in the next 10 to 15 years.

I offer this as just one example. My principal point is that we need to address these individual issues such as expanding the RRF.

When we address those individual issues we need to do that in a much broader context and see if the solution to the one issue can also be a partial solution to the much bigger issue of the entire shipbuilding industrial mobilization base.

Mr. Chairman, let me conclude my comments by again thanking you for inviting the shipbuilding industry to participate in these hearings. I would also like to respectfully suggest that it might be very useful if sometime in the future we could also convene a similar hearing that would specifically address the future of the naval shipbuilding capacity in the United States and its implications for our defense planning a decade from now. Thank you very much.

With Attachments

TESTIMONY OF

RICHARD H. VORTMANN

CHAIRMAN & CHIEF EXECUTIVE OFFICER

NATIONAL STEEL AND SHIPBUILDING COMPANY (NASSCO)

BEFORE THE HOUSE

SUBCOMMITTEE ON MILITARY PROCUREMENT

MARCH 30, 1995

21-267 96 – 37

STRATEGIC SEALIFT

Mr. Chairman, thank you for this opportunity to appear before the Military Procurement Subcommittee of the House National Security Committee. I am Richard H. Vortmann, Chairman and Chief Executive Officer of National Steel and Shipbuilding Company (NASSCO) located in San Diego, California. Let me first say that I and the 4,000 other employee-owners of NASSCO greatly appreciate the leadership which you have shown on behalf of the U.S. shipbuilding and repair industry over your fourteen years in Congress . Your strong support for our national security and our U.S. defense industrial base including U.S. shipyards has been unwavering. Let me also congratulate you, Mr. Chairman, on your well-deserved appointment to chair of this important subcommittee.

As CEO of NASSCO, I also serve on the Board of Directors of the American Shipbuilding Association (ASA) which is the new trade association consisting of our nation's six largest private shipbuilding yards. These six shipyards build all of our nation's complex combatants and large amphibious and auxiliary ships, including Sealift ships for the U.S. Navy and employ over 90% of the workers in U.S. shipyards.

NASSCO is a long-time builder of U.S. Navy amphibious and auxiliary vessels. We have built forty ships for the Navy over the last thirty years. Particularly relevant to this Hearing, NASSCO has been a dominant player in building Sealift Ships for the Navy. We delivered three S/L-7 Fast Deployment Logistics Ships (TAK-R) and three Maritime Prepositioning Ships (TAK) for the Marine Corps back in 1984-1985. In 1993, NASSCO was selected by the U.S. Navy to accomplish both conversions and new buildings for the current Strategic Sealift Program. NASSCO also has a long and proud history of building commercial ships in San Diego, primarily tankers and containerships. Our past practice and on-going goal is to maintain roughly a 50/50 split between Navy and commercial work.

My remarks today are intended to offer the views not only of my shipyard, NASSCO, but also to reflect the views of my fellow major U.S. shipyard ASA members. We believe the issue of adequate Sealift is of vital importance to our Nation's ability to project power overseas as dictated by our national security interests. Previous hearings, such as this one on Strategic Lift, have been the catalyst leading to the formation of a national Sealift policy. For too long, Sealift has been treated as a stepchild in our national defense planning and budgeting. Without the foresight exhibited by Congress in the FY-90 and FY-91 budgets which mandated an updated mobility study, the current strategic Sealift Program

may not have become a reality. Even before the 1990 Desert Shield/Storm crisis, Congress recognized that a serious shortfall existed in our ability to quickly transport military rolling stock to trouble spots around the world. Desert Shield/Storm involved a deployment at a rate 33% higher than that of the Korean War and at a time when the Navy, the U. S. Merchant Marine, and the reserve ship force were much smaller than in 1950. Sealift, once again, was required to carry over 85% of the dry cargo tonnage to ensure the success of our troops ashore. Fast sealift RO/RO ships were proven to be the most valuable sealift asset. Desert Shield/Storm proved that RO/ROs are needed to meet prepositioning, surge and sustainment missions and are vital to our national security interest. However, the multi-purpose RO/RO as a ship type is fading from commercially viability in today's world fleets. More importantly, the transportation requirements of the U.S. military equipment, such as self unloading, vehicle turning radius, deck strengths, and deck heights, often exceed commercial ship standards of typical car carrier RO/ROs. An M1-A1 Tank is obviously a different cargo than a Toyota Celica. It is for these reasons that Congress recognized the need for a dedicated U.S. fleet of sealift ships, specifically designed to meet the requirements of carrying and delivering U.S. military equipment into developed or undeveloped countries.

The congressionally mandated Mobility Requirements Study, dated January

1992, established a requirement for acquiring the equivalent of twenty large, medium-speed (24 knots) RO/ROs (LMSRs) to carry Army unit equipment for both prepositioning and surge missions. During the summer of 1993, contracts were placed with three U.S. shipyards for five conversions, two at Newport News and three at NASSCO, and twelve new constructions, six at Avondale and six at NASSCO, for a total of seventeen of the LMSRs. To date, eleven of the LMSRs have been funded and awarded; six options, subject to funding, exist between the two new construction shipyards (two options must be exercised by December 31, 1995; two options by December 31, 1996, two options by December 31, 1997). The FY-96 Budget request includes funding which will allow the next two ships to be awarded before year end. Mr. Chairman, we hope that your committee will support the FY-96 budget request, as well as the additional funding in FY-97 and 98, for the other four option ships. Additionally, I hope the committee will be able to fund the completion of the original 1992 mobilization requirement study which calls for the equivalent of a total of twenty ships. As I said, seventeen ships are currently under contract including the six under options awaiting funding. To complete the original requirement of the equivalent of twenty ships will necessitate funding for two more ships in addition to the funding for the six options.

The conversion and new construction programs are well underway at the three shipyards. A summary of the ship designs is provided with this testimony

along with the make up of three nominal loadouts of military cargo. For sake of comparison, these new LMSRs currently under construction for the Army each have about two to three times the square footage of RO/RO decks and much greater flexibility than the eight fast sealift ships (SL-7 conversions) the Navy procured ten years ago which performed so well in Desert Storm/Desert Shield. A delivery schedule of the new LMSRs by fiscal year is also provided for the record. I understand from the Navy that these delivery schedules meet the Army loadout requirements.

I have also been asked to share my views on the U.S. Government's practice of procuring existing, used or previously owned, foreign built, foreign flag ships for the Ready Reserve Fleet. But before I address this, I would like to take a minute to put my opinions in a much broader perspective.

Our country faces a serious, growing issue with our defense industrial mobilization base. I believe I can speak knowledgeably for the shipbuilding aspect of this. It is quite clear that currently the Navy's need for new ships is substantially less than the current naval shipbuilding capacity in the Unites States. That capacity has already shrunken through yard closures resulting from the fact that our naval fleet is being contracted from 600 ships down to 340 ships. Private shipyard employment was approximately 155,000 in the late 1970's, is now

70,000, and is projected to decline significantly further in three years as the full impact is felt of the dramatically reduced SCN budget.

This decline in shipbuilding does not represent an immediate problem for our Navy or our country today. Because of that I fear it is being overlooked or ignored in our nation's policy priorities with respect to the future.

While it is clear we have excess shipbuilding capacity today, once our Navy fleet reaches its steady state condition of 340 ships, the simple replacement demand of 10-12 ships per year for that size fleet will require much more shipbuilding capacity than will be utilized in the next few years. This shortfall will be much larger if unfolding world events indicate that we have cut our fleet too far - and that 340 ships cannot serve our needs and adequately project U.S. forces where we need them, and when we need them.

We need to ensure that sufficient shipyard capacity will still exist when the Navy needs it. In order to do that, very simply our shipyards will need additional volume over the next several years to replace the declining Navy new buildings. This much needed additional volume will accomplish two principal things. First, it will help hold down the unit cost of the few ships you will be budgeting for the Navy over the next few years by spreading the shipyard overhead over a broader

base. Secondly, this added volume will maintain the existing physical shipyard capacity and the skills of thousands of shipyard workers, design engineers, blue collar craftsmen, and construction managers.

Without this additional volume, more U.S. yards will be forced out of business. And typically once a yard is shutdown it is not retrievable - shipyards are typically prime real estate which gets converted to alternative uses such as container ports, luxury waterfront condominiums or commercial properties.

The adverse consequences of the declining shipbuilding activity are quite clear. Equally clear is the need for additional volume to prevent it. But what is not clear is <u>how</u> to create that needed volume for U.S. shipyards.

The only answer to the "how" that is clear is that the added volume must be commercial ships. But the tougher question is where do the U.S. yards get commercial volume? In the past, U.S. yards have enjoyed a share of the worldwide commercial market place. I said at the outset of my remarks NASSCO's basic volume traditionally has been split 50/50 between Navy and commercial over the years. But it is most important to note, the worldwide commercial market has never been a free and fair market place, never has and never will be. Governments have always been involved in their countries'

shipbuilding industries dating back a couple of centuries when a nation's sovereign power was in direct proportion to its sea power, both military and commercial. Our government was no exception. Essentially all the commercial shipbuilding in the United States in the 1970's was under some form of government involvement in the marketplace. But as many of you well know, our government halted its shipbuilding subsidy program in 1981 in a bold attempt to lead the world to free trade by example. The best I can say is that it was a noble experiment; the facts are that it utterly failed. No country followed the U.S.'s lead. In fact, many governments actually increased their aid programs to their industry in an effort to expand their market share.

The OECD Shipbuilding Trade Agreement that was recently negotiated and that will shortly be brought before Congress is totally flawed and is counterproductive to helping solve the defense industrial problem we face here in the U.S. We must look elsewhere for a solution.

That brings me back to the issue of the current U.S. policy of acquiring foreign built ships for the Ready Reserve Fleet.

I know this hearing is directed at Strategic Lift, and not the U.S. Shipbuilding Industry's broader based problems. I have mentioned the latter only

because as we address specific issues as alternative approaches to Sealift, we should try to encompass the broader issues at the same time.

With regard to the U.S. government practice of procuring foreign built, previously owned commercial RO/ROs for the RRF, Mr. Buzz Fitzgerald, Chairman of ASA, testified before you on March 7, 1995, and recommended that this practice must be stopped. I would like to expand on his remarks. As I understand it, the MRS recommended adding nineteen RO/ROs to the RRF to achieve a total of thirty-six RO/ROs. Based on the most recent acquisition of two NedLloyd RO/ROs for the RRF by MarAd, this RRF RO/RO fleet represents a total expenditure of about $800 million in acquisition cost alone, plus an annual cost of $2-3 million/year/ship to maintain these ships. Over a ten-year period, this represents close to a $2 billion investment of taxpayers dollars. The issue, in my mind, is whether this is a sound expenditure of U.S. taxpayers' dollars, especially when taken in the context of the needs of U.S. shipyards for ship construction orders. I believe this is a bad policy and is shortsighted for several reasons:

1. U.S. taxpayers are sending dollars to foreign ship owners who will use our money to replace these old ships they are selling to us with new ships built in subsidized foreign shipyards.

2. Laying up ships in the RRF does nothing to provide a pool of maritime labor to man the ships, if needed. This is a serious problem which is becoming more acute given the increasing size of the RRF and at the same time the continued declining size of the active U.S. flag commercial fleet.

3. Maintenance costs for RRF ships are very high.

4. The existing ships in the RRF are aging and will need to be replaced soon. Yet the concept of buying used foreign RO/RO's will not be feasible in the future as there will be fewer of these aging ships available. As I said earlier, the multi-purpose RO/RO containing features that make them attractive for carrying military cargoes are becoming obsolete. That is why the foreign owners are selling them. By the time our RRF needs to be replaced, there will be few if any used foreign RO/RO's to buy. Thus we will need to eventually come up with an alternative approach.

5. Lastly, and most importantly the acquisition of the foreign ships does absolutely nothing in terms of helping address the problem in the U.S. naval shipbuilding industry. Effectively this approach has us spending U.S. taxpayers' dollars abroad while a critical defense industrial base problem gets worse here at home.

In my view the ideal solution to this need for a larger RRF is to creatively develop a program which satisfies our need for more ships and at the same time helps address the maintaining of vital shipyard capacity issue. One example of such a creative program would have a fleet of active U.S. Flag RO/RO's, newly built in the U.S. shipyards needing volume to replace declining Navy orders. These RO/RO's would be in active commercial service and could be called on in a time of national emergency. Car carriers are still in commercial demand in sufficient numbers and the world fleet of car carriers is aging. Certain defense features like heavy decks and ramps, adequate deck heights, speed, etc., could be designed and built into a car carrier for modest cost to make it capable of carrying military rolling stock during emergencies. Several years ago, as a result of significant Congressional pressure, we recall that the Japanese agreed to put four new car carriers under U.S. flag carrying Japanese autos to the U.S. Unfortunately the U.S. did not then also insist that the ships also be built in the U.S. I believe agreements of this type for a share of a cargo could be reached with our nation's trading partners if the need was clearly based on our national security purposes.

There might well be better variations on this theme, but this is one approach to obtaining the "reserve fleet" ships our Navy needs, together with active American seamen crews, and at the same time start to create the replacement

volume needed in the U.S. shipyards currently building the declining number of Navy ships.

I offer this as but one example. My principal point is that as we address these individual issues such as expanding the RRF, we need to weigh our alternatives against the bigger picture issue of how to maintain our base of shipyards with Navy shipbuilding capability.

Mr. Chairman, let me conclude by expressing my appreciation for your holding this hearing on Sealift and for your invitation to U.S. shipbuilders to address this committee. I would respectfully request that you also convene a similar hearing on the future of Navy shipbuilding capabilities in the U.S. and its implications for our defense planning a decade from now.

# # # # #

SEALIFT DESIGNS

Characteristics	NASSCO Conversion	Newport News Conversion	NASSCO New Construction	Avondale New Construction
Principal				
Length, Overall	906'11"	954.0'	950.0'	950.0'
Length, BP	805'8"	894'6"	905'0"	884.0'
Depth, to Weather Deck	90.0'	89'2"	89'1"	91'2"
Beam (Molded)	105'6"	105'8"	105'9"	105'10"
Draft, Design	34'5"	35.0'	34.0'	34'8"
Draft, Scantling	37.0'	37.0'	37.0'	37.0'
Displacement, CAV 9	54,298 LT	55,422 LT	62,644 LT	62,069 LT
Accommodations, Total	95	95	95	95
Cargo (FT2)				
Weather Decks	50,932	49,971	41,319	65,538
Hoistable Decks	29,231	54,736	0	59,792
Fixed Decks	234,001	228,100	348,472	272,083
Total	314,164	332,807	389,791	397,413
Propulsion				
Propulsion	1 Shaft LSD	3 Shaft LSD	2 Screw Gas Turbine	2 Screw MSD
Engines	B&W 12L90 GFCA	(1) B&W 12K84EF (2) B&W 9K84EF-P/S	(2) GE LM 2500s	(4) Colt-Pielstick 10PC4.2V
Installed BHP	46,653 BHP	26,000 BHP 19,500 BHP-P/S	64,000 BHP	65,160 BHP
Range	12,000nm	12,000nm	12,708nm	12,221nm
Speed	24 KTS	24 KTS	24.1 KTS	24.2 KTS
Propeller Type	FPP	CPP FP-P/S	CPP	CPP
Propeller Diameter	24.6'	21.33' 19.17'-P/S	24'	22'
Number of Blades	6	4 6-P/S	5	4

LOADOUT SCENARIOS

EQUIPMENT	PREPOSITIONING	SURGE AIR ASSAULT	SURGE ARMOR
M1A1 Tanks	-	-	58
CH-47	-	15	-
Bradleys	60	-	6
UH-IH	-	1	-
H-60	-	12	-
Eng. Tracks	2	44	2
Other Tracks	65	-	40
Eng. Wheels	-	68	-
140T P&H Crane	2	-	-
Forklifts	72	14	6
RTCHs	16	-	-
Semi Combos	127	73	152
Semis	51	14	53
Heavy Trucks	26	5	49
Medium Trucks	1	-	-
Light Trucks	140	395	281
Light Trailers	5	47	49
Light Wheel Combos	141	404	254
Other Wheels	16	99	76
	724	1,191	1,026
Total Sq. Footage	235,067	278,987	272,774

3/95

STRATEGIC SEALIFT PROGRAM

NEW CONSTRUCTION/CONVERSION DELIVERY SCHEDULE*

	FY-93	FY-94	FY-95	FY-96	FY-97	FY-98	FY-99	FY-00	FY-01	FY-02	Total
NEW CONST. PREPO											
Award	2	2	2	2	-	-	-	-	-	-	8
Delivery	-	-	-	-	1	3	3	1	-	-	8
NEW CONST. SURGE											
Award	-	-	-	-	2	2	2**	-	-	-	6
Delivery	-	-	-	-	-	-	-	1	5	-	6
CONVERSION* **											
Award	5	-	-	-	-	-	-	-	-	-	5
Delivery	-	-	-	4	1	-	-	-	-	-	5
DELIVERY SUMMARY	-	-	-	4	2	3	3	2	5	-	19

* Delivery profile reflects latest conversion and new construction schedule
** FY-99 ships require new contracting action
*** PREPO (CSP) conversions transfer to surge as new construction ships are delivered

3/95

STRATEGIC SEALIFT SHIPS
(NEW CONSTRUCTION)

Fact Sheet

Principal Characteristics

Length Overall ..... 950′ - 0″
Length Between Perpendiculars ..... 905′ - 0″
Beam, Molded..... 105′ - 9″
Design Draft ..... 34′ - 0″
Scantling Draft ..... 37′ - 0″
Displacement at Design Draft : ..... 62,700 LT
Cargo Stowage Area (Total) ..... 393,000 Sq.Ft.

Mission

Deployment of military cargoes in either prepositioning or surge mode to anywhere in the world.

Hull Arrangements

Berthing, Living, Messing, Recreation, and Office spaces for a permanent crew consisting of 13 officers and 32 unlicensed personnel. Similar facilities are available for supercargo crew of 2 officer, 12 NOCs, and 36 enlisted personnel. Additional features include leisure and community facilities, hospital complex, laundry facilities, and workshops.

Propulsion Plant

- Two GE LM2500 gas-turbines with an output of 32,000 BHP each
- Two 24′ - 0″ controllable pitch propellers at 95 RPM at full power
- 12,500 KW total ship's service generating capability
- 2,000 KW emergency generating capacity

Speed and Endurance

- Design speed is 24 knots @ 90% MCR at design draft
- Range is 13,800 miles at design speed and draft

Cargo System

- Self sustaining Roll On-Roll Off (RO-RO) capabilities
- Self sustaining Lift on-Lift Off (LO-LO) capabilities
- Optimized for RO-RO operations
- Capable of the following cargo operations using ship's equipment:
  - RO-RO, LO-LO, and transport vehicles
  - RO-RO, LO-LO, and transport containers
  - LO-LO and transport lighterage
  - RO-RO and LO-LO cargo onto a pier
  - RO-RO and LO-LO cargo in-stream in Sea State 3
  - Simultaneous RO-RO and LO-LO capability

Cargo Handling Equipment

- Centerline stern slewing ramp
- Port and starboard sideport ramp system
- Two single pedestal twin cranes
- Cargo hatches in three holds
- All RO-RO decks fixed
- Combination of fixed and hinged RO-RO ramps

Special Features

- Environmental control for cargo holds
- Foam firefighting and de-watering system for cargo holds
- Bow thruster units
- List control system

Navigation and Communication Equipment

- Satellite navigation receiver with GPS
- LORAN C
- RDF
- Doppler speed log
- Echo depth sounder
- Full communications suite

Design and Construction by

National Steel and Shipbuilding Company

San Diego, California
(619) 544-3400

STRATEGIC SEALIFT SHIPS
(CONVERSION)

FACT SHEET

Principal Characteristics

Length Overall.....885'-1.5"
Length Between Perpendiculars.....850'-9.5"
Beam, Molded.....105'-7.5"
Design Draft.....34'-6"
Scantling Draft.....37'-0"
Displacement at Design Draft.....54,315 LT
Cargo Stowage Area (Total).....314,164 Sq.Ft.

Mission

Deployment of military cargoes in either prepositioning or surge mode to anywhere in the world.

Hull Arrangements

Berthing, Living, Messing, Recreation, and Office spaces for a permanent crew consisting of 13 officers and 32 unlicensed personnel. Similar facilities are available for supercargo crew of 2 officers, 12 NCOs, and 36 enlisted personnel. Additional features include leisure and community facilities, hospital complex, laundry facilities, and workshops.

Propulsion Plant

- 12 cylinder B&W direct drive, reversible, slow speed diesel main engine, type 12L90GFCA with an output of 47,300 bhp (metric) at 89 rpm.
- Single 24'-7.5" fixed pitch six-bladed propeller
- 12,560 KW minimum total ship's service generating capacity
- 1,750 KW emergency generating capacity

Cargo System

- Self sustaining Roll On-Roll Off (RO-RO) capabilities
- Self sustaining Load On-Load Off (LO-LO) capabilities
- Optimized for RO-RO operations
- Capable of the following cargo operations using ship's equipment:
  - RO-RO, LO-LO, and transport vehicles
  - RO-RO, LO-LO, and transport containers
  - LO-LO and transport lighterage
  - RO-RO and LO-LO cargo onto a pier
  - RO-RO and LO-LO cargo in-stream in Sea State 3
  - Simultaneous RO-RO and LO-LO capability

Cargo Handling Equipment

- Centerline stern slewing ramp
- Port and starboard sideport ramp system
- Single pedestal twin cranes (two)
- Cargo hatches in three holds
- Combination of fixed and hoistable RO-RO decks and ramps

Speed and Endurance

- Design speed is 24 knots @ 90% MCR at design draft
- Range is a minimum of 12,000 miles at design speed and draft

Special Features

- Environmental control for cargo holds
- Foam firefighting and de-watering system for cargo holds
- Bow and stern thruster units
- Activated anti-roll fins
- Heel control system

Navigation and Communication Equipment

- Satellite navigation receiver with GPS
- LORAN C
- RDF
- Doppler speed log
- Echo depth sounder
- Full communications suite

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Mr. HUNTER. I think your suggestion is well taken, Mr. Vortmann. Thank you for a very complete statement and Admiral Quast.

What I would like you to do, if you could, is simply move to your left a little bit there. Let's rearrange our name plates and let's bring up our first panel of witnesses so everybody is here.

I will turn to the ranking member of the subcommittee, Mr. Skelton, for the first question to the entire panel; the gentleman from Missouri.

Mr. SKELTON. Thank you very much.

I have only one question. I think, General Rutherford, you might be the best one to answer it, although others may wish to add to it.

There are those who argue that we don't need quite as much additional airlift and sealift as heretofore proposed because of pre-positioning that has been done, particularly in Southwest Asia. Would you agree or disagree with that? Would you explain your answer please?

General RUTHERFORD. To the extent that we pre-position, obviously we do mitigate to a certain degree the amount of lift that is required in both air and sea. As we have mentioned earlier, the stated airlift requirement as we know it today is 49 million to 52 million ton miles per day.

The differential between those two depends upon how much PREPO and what the economic decision is there. In terms of sealift, we have the same time factored in PREPO into the equation when we talk about 10 million square feet of surge sealift. That has got certain assumptions about how much PREPO we have in place.

As you know today, there is PREPO in Kuwait, for example. There were some recent discussions between the Secretary of Defense and the members and KATAR on PREPO and additional equipment. That is all factored in and is already accounted for when we state our sealift requirements as you see them today.

Mr. SKELTON. The issue of out-sizing requirements, do you preposition out-size or larger cargos or is that taken into consideration in pre-positioning in airlift and sealift needs?

General RUTHERFORD. Obviously, we would like to get to the point where the heaviest equipment and the bulkiest equipment is pre-positioned. That is always possible, sir. Many pieces of the equipment simply cannot afford to be placed in a web, if you will, or sitting out on land.

A helicopter, for example, it would take you too long to break it out, get it up and operating. Similarly, it does not ride well in the bottom of a ship for months on end. Communications equipment, missile systems, Patriot systems, for example, multiple rocket launchers. Those kind of things are not well suited for pre-positioning and consequently must be moved into the area, generally speaking.

Mr. HUNTER. The gentleman from Mississippi, Mr. Taylor.

Mr. TAYLOR. Just out of curiosity, General Rutherford, I noticed you didn't look at air bus as an alternative. Doesn't it strike you strange that the Navy is out buying foreign ships and the Air Force isn't? I happen to think you guys are right.

General RUTHERFORD. Which ones?

Mr. TAYLOR. The Air Force guys, with all due respect, Admiral. I want to compliment you on that. The air bus should not even be a part of your equation when we have domestic manufacturers capable of making these. I wish the Navy would take heed. Thank you, Mr. Chairman.

Mr. HUNTER. Mr. Chambliss.

Mr. CHAMBLISS. Thank you, Mr. Chairman.

I have listened to the proceedings thus far with a lot of interest. I am very impressed by what all of you gentlemen have had to say. I want to particularly address my remarks to General Rutherford and General Hawley.

With Robins Air Force Base in my district, a depot that services our Air Force fleet of 130's and 141's, I am keenly aware of the vital military missions satisfied with airlift capability.

I am sure you are both aware of the great work that is being done at Robins on the 141 center wing box replacement project. It will extend the flying hours of the 141 fleet to 45,000 hours. This is however a stop-gap measure; one that will only buy us a few years of time to make vital decisions regarding the future of our force projection needs all over the world.

I am particularly interested in all of the discussions surrounding the force structure required to satisfy the needs identified by the Mobility Requirements Study. In recent weeks, this committee has heard testimony from respected leaders calling into question the need identified by that study, suggesting that our current lift capability is sufficient only to support a single MRC.

With an aging 1–41 fleet that faces retirement in the near-term, I am concerned that no C–17 procurement plan can keep pace with actual airlift requirement for our military forces to face two MRC's.

I acknowledge the good efforts and the fine performance of the C–17 program. I am extremely encouraged about what Mr. Kozlowski had to say about it. We really have done a great job in that respect.

Capable C–17's are being delivered at this very moment, ahead of schedule, and ready to satisfy our increasingly unique airlift needs well into the 21st century. For the lion's share of our lift requirement including out-sized cargo and the ability to assist hard-to-reach airfields around the world, there is no disputing in my mind that the C–17 is the transport that fulfills the needs of our Air Force.

It seems to me that your evaluations thus far, and I am talking to the two generals, that your evaluations thus far argue for the most aggressive C–17 procurement rate possible. Generals, I am also concerned about our more traditional strategic lift requirement.

As I noted for years, Robins has supported the vital role played in strategic by the C–130. Reliability and low cost have marked that aircraft's contribution to our military mission. I understand the new C–130J model will continue that fine tradition.

Moreover, it does so affordably. It is ready for immediate production to meet our own leaders' concerns about a near-term, two MRC scenario. Amidst all of the concerns about a failure to meet the needs of two MRC's, Generals, I would like to ask each of you to

comment about the unique and complimentary roles that could be played by the C–17 and the C–130J in meeting our increasingly demanding needs for long-range strategic lift.

I would like to emphasize, however, General Rutherford, your own testimony for the record and its discussion of the strategic airlift Air Force mix analysis. In that discussion you correctly identify the importance of flexibility afforded this Nation by those unique military characteristics only certain aircraft provide.

In your own words, General, you said, "That will prove critical in military operations of the future, just as they have in the past." I would appreciate you all's comments.

General RUTHERFORD. Let me first address the C–130J, sir. You notice that I did not mention the C–130J in my prepared remarks. That is simply because the C–130J's do not belong to me in the U.S. Transportation Command, as funny as that may seem.

Those have been provided to the Unified Commanders for intertheater work. That's the way they would be employed. If you will, the strategic lift made up of C–5's, 141's, C–17's, NDAA's will deliver the material to the theater and then it will be distributed within the theater by the C–130 force.

The Air Force is fully aware of the tremendous capabilities and the reliability and maintainability that has been built into the C–130J. I think we are looking forward to having them in the force soon. The numbers are probably not as many as we would like to see, as fast as we would like to see, but I think everybody knows that dollars are hard to come by now.

It is my understanding that the Air Force is very much in favor of the C–130J's replacing our C–130E models as soon as we possibly can. Dick, do you want to add anything?

General HAWLEY. Yes, sir. As you know, we will get two C–130J's out of the 1994 buy that went to support modernization in the Air National Guard. We will use those to test this new version of the airplane. I would like to point out that as we talk about C–17's, C–130's, and NDAA's, when I talked about our process for getting to a decision in November, virtually everything that has been discussed here is being tested, analyzed and folded into that overall decision process so that when the defense acquisition executive assesses all of these factors to make the decision on how many C–17's to buy, what mix should be between the C–17's, NDAA and tactical airlift, will be a factor as we go through that analysis.

These things will be considered so that we can make the right decision for the country and produce the overall mix of strategic airlift that we need to carry us into the future.

Mr. HUNTER. I thank the gentleman. The gentleman from Missouri, Mr. Talent.

Mr. TALENT. I thank the Chairman. I find that Mr. Chambliss and Mr. Saxton have covered a lot of the areas I wanted to cover. Let me just make a comment.

I am assuming, General Rutherford, that when the department completes its review and issues a report that you will go into detail on questions of comparisons on things like survivability and vulnerability which are certainly very important to me.

You weren't able to comment before on the comparisons of the 747 and the C–17. I think those kinds of issues are obviously going

to be vital, in part because war is not a static thing. How survivable an aircraft is may determine whether people attack it.

In other words, we may be in a situation where if the enemy believes that it is a plane coming in with transport that they can get, then they will make an effort to get it, that they otherwise wouldn't. These are the kinds of factors that I am sure the other members of the committee feel as well.

We need your detailed recommendations on before you can make this difficult balancing. I look forward to that report. I just want to add to what some others have been saying. For Mr. Kozlowski, I am just really very pleased at the way this program has turned around.

It is going in entirely the right direction. I want to congratulate you on your very fine work. This is like night and day from where we were a couple of years ago. Everybody recognizes this aircraft is going to be the core of whatever we do. I am just very pleased that it looks like it is on schedule and everything is fine.

If you want to comment on my comment, general, please feel free to.

General RUTHERFORD. The reason I cannot comment on the survivability of the 747 versus the C–17 at this stage of the game is we are just now going out for a proposal to industry and asking them to tell us, given this need, what kind of airplane would you like to bid? What would the characteristics of that airplane be?

Until I have that proposal from industry, it is difficult for me compare that against what I do know today about the C–17. So, that's why I am reluctant to say anything.

Mr. TALENT. Are you confident we are going to have this information in time to make an intelligent decision as quickly as we need to make it? We had the testimony of the officers last week. Was it last week, Mr. Chairman? The days just run together.

The effect that we don't have enough lift now for the two MRC's, maybe not enough for one. This is obviously a serious deficiency we need to address. Are you satisfied that we are going to know what we need to know within an acceptable time frame?

General RUTHERFORD. I would urge this committee and Congress not to hurry to a decision on the lift equation until we have put the pieces of the pie together. That is what this analysis that we talked about earlier, this process that we are going through leading to a November decision is really about.

If you do, I don't think we are going to have all of the pieces of data that we need. We might make the wrong judgment. I believe we have enough time to wait until November to gather the information which I think is essential to make that decision.

You will obviously make the decisions that you elect to make when you elect to make them. I would urge you to wait until we have gathered the data and have the correct information that I think we need on cost, performance, attributes of the various machines that we are talking about so that we can make an informed decision.

Mr. TALENT. I mentioned and Mr. Chambliss mentioned also the statements that the current lift is not adequate for us to fight two MRCs at the same time. You have evidently resisted the temptation to comment on that. Would you care to?

General RUTHERFORD. I would be more than happy to address that issue in closed session. I think to adequately address it, I must get into closed session and talk about MRS BURU and some of the details associated with that.

I feel that we do have the capability today to support one major regional contingency. As a matter of fact, I think we can do two major regional contingencies, but not without some risk. We need to talk about that in closed session.

Mr. TALENT. The whole strategy of foreign policy just turns on the ability to project these forces. When you hear people who obviously have some expertise telling us that we are woefully inadequate, obviously it is a cause of some concern.

General RUTHERFORD. I have great respect for those gentlemen. As a matter of fact, I used to work for some of them.

Mr. TALENT. I thank you, Mr. Chairman.

Mr. HUNTER. I thank the gentleman. The gentle lady from California, Ms. Harman.

Ms. HARMAN. Thank you, Mr. Chairman.

Thank you for including me in this hearing, though, I'm not a member of this subcommittee. This is a subject of intense interest to me as I know the committee knows it is a subject of intense interest to the committee. I think one of the high points of the last Congress was the bipartisan effort to fund six airplanes, six C–17's, and to make sure that the Defense Department had time to make the case for those six planes.

Mr. Kozlowski, I am thrilled to read your testimony and to see what progress has been made. I want to commend, not only you, but the wonderful workers at the McDonnell Douglas plant in Long Beach, some of whom live in my district, for the job that they have been doing and that they are doing.

Let me just make a couple of points about all of this. First of all, I think that Mr. Dellums did us a great service by pointing out two issues that we really need to be cognizant of.

One of them is that we are not talking about a competition, a winner takes all competition, between the C–17 and nondevelopmental aircraft. It would be impossible. There is a chart that was in your testimony, Mr. Evatt, that perhaps you highlighted for everyone.

I apologize, I was not here when you testified, but it shows the various features, general airlift features, and military unique airlift features of various kinds of airplanes. The C–17 and the 747–400F are not the same. I don't think we should be believing that they are the same or will be the same. They are different.

I think the challenge for this committee, certainly speaking for me, is to make sure that we have enough C–17's to meet airlift needs covering the features that it offers, which on this chart are more features than any other airplane.

That if we need additional capacity and don't need all of those features, we also have non-developmental aircraft. I want to associate myself with the fact that this is not a winner takes all competition.

The other point that Mr. Dellums made that I think is critically important here and will be critically important when we consider

other kinds of procurement like B–2 is the overhead that DOD adds to the fly away costs, the cost per airplane.

I would urge, Mr. Chairman, that we do as thorough a study as we can of what that overhead is comprised of. As we saw in the conversation earlier with Mr. Saxton, we can almost double the cost of an airplane by adding the DOD overhead.

I would hope that with procurement reform and with reinventing government and with the enormous talents of the chairman of this subcommittee, we could find a way to reduce that overhead so that our scarce defense dollars could go farther.

I would just like to speak for that and for one other point. It has been in the press recently that some people are interested in perhaps trading the C–17 for the B–2. I don't know if anyone is interested in that. I certainly am not.

I think those are very different and not competitive options. Again, if we focus on ways to reduce DOD overhead, we may have a better chance of fully funding our airlift needs and fully funding our bomber needs for the future.

I just want to make that point. The only question I have for this panel is, do you think that there is some room in this great subject called DOD overhead to reduce the cost of some of these procurement assets?

General HAWLEY. Yes, ma'am. In short, there is a lot of room. We are working very aggressively at that. As you know, acquisition reform is one of the Secretary of Defense's top priorities. He has given a charge to all of the service acquisition executives to pursue that who have in turn given the same charge to all of the people in the acquisition system to pursue it.

We are making a lot of progress. We have some fine examples, joint direct attack munition [JDAM], wind corrected munitions dispenser, the joint primary aircraft training system [JPATS] are all programs that the Air Force is managing which are great success stories. The other services have similar success stories.

We are figuring out better ways to do business. Cut overhead, reduce cycle times, make sure we get the requirement right up-front so we don't go drive in added costs that aren't necessary. The NDAA solicitation that we are talking about here has no milspecs or standards involved in it.

These are all things that we can do to help solve this problem of DOD overhead and get our cost down for these systems that we need.

Ms. HARMAN. Thank you. General Rutherford, do you have any comments?

General RUTHERFORD. There are other factors, if we are talking about the difference between $210 million and a $300 million airplane. There are things over and above the cost of the airplane that are really not associated with overhead per se; spares and other things that go with, of course, the airplane.

But I agree with General Hawley there is much room for reducing overhead costs although I don't think it is the difference between $210 million and $300 million.

Ms. HARMAN. I didn't mean that. I do think if we can get this overhead down, we have a much better chance of meeting, as I see

it, the enormous requirements that this country has for our defense assets.

Does anyone else have anything to say about this subject?

Mr. KOZLOWSKI. Yes, I do. We have been looking at specific overhead items like oversight costs, internally to the corporation, internally to DAPRO organization resident on site and the entire infrastructure and the acquisition community.

As some of these things can be tackled at the DOD level by waiving certain regulations, some will have to come back to Congress and ask for waivers or changes in the law. At least we are working today on sort of a mutual agreement between us and the local oversight from the Air Force.

As we verify better demonstrated performance, put it in the bank and it stays stable, they will then back off and reduce the oversight. The oversight doesn't show up in the budget, per se. It is somewhere there in the overall cost of government.

Therefore, it would be a cost reduction on our side of the ledger and a cost reduction to the taxpayers on the other side. The climate is very healthy in that respect. We are digging into it.

Ms. HARMAN. Thank you.

Mr. HUNTER. If the gentle lady would yield for 1 minute. I can remember 1981, Mr. McCurdy and I were allowed to lead an ad hoc group. We figured we would take 2 weeks and reform the procurement system. It didn't work out. There were all of those initiatives being undertaken, all of those directives which were going to the field and all of the guys in the field in the uniform figured they all needed to be in the plant, by God, to oversee those contractors.

I remember one thing that I think Jack Wilson of Boeing said. He said, I'll tell you what's wrong with procurement today. He gave an example. He said, I just delivered a bunch of planes to Western Airlines or wherever. He said we came in ahead of schedule and under cost.

He said I had one representative of Western Airlines in my plant while I was making their planes. He had me mention an Air Force program going. He said I got 200 dog-on Air Force people in there. Every time my people try to spend a productive day, they are called in to spend all of their time briefing the Air Force on what they have done, will do and will do in the future.

Things haven't changed much. I actually was shocked when the CEO of Electric Boat said he would put into contract reductions in price, massive reductions in price in return for the Navy getting out of his hair in the construction process. I was surprised at that.

How many people do you folks have in the C–17 plant, General Hawley?

General HAWLEY. I don't know how many we have in the plant. Most of them are actually development procurement regional office [DEPRO] as opposed to Air Force people. Our people are generally——

Mr. HUNTER. Yeah, how many people, uniformed or nonuniformed, but representing DOD?

General HAWLEY. We have in excess of 200 people involved in overseeing the program, managing the program on the government's side.

Mr. KOZLOWSKI. Can I volunteer a little help?

General HAWLEY. You certainly can.

Mr. KOZLOWSKI. As I said, the head count of local resident active in place in Long Beach was 140 and it is down to 125 on the part of the government. So, it is coming down.

Mr. HUNTER. You made a massive reduction, 15.

Let me ask you something, Mr. Kozlowski. Would you tend to follow this extraordinary step that the CEO of Electric Boat offered up which was that he would make contractual reductions in cost in return for the service doing specific things to be a better customer?

Mr. KOZLOWSKI. In fact, as part of the overall should cost conducted by the Air Force, we have a whole series of cost reduction initiatives. Some of those have already been negotiated.

It says, if you do this, we'll do this. You can forget who the "we" and "they" are. It is two-sided street in how to reduce those costs.

Mr. HUNTER. Do you think you need 125 in your plant?

Mr. KOZLOWSKI. I work for the Air Force, sir.

Mr. HUNTER. I understand that, but you are working for the taxpayer, too.

Mr. KOZLOWSKI. As it comes down, it is different. In a commercial world we have a very small handful of people. The process is different. That's the analogy that we are taking. Can we apply the commercial practice in the DOD world? That is what we are looking at. Can we get by with less? Yes, sir.

Mr. HUNTER. Do you think the Air Force could do a good oversight job with 20 people in the plant?

Mr. KOZLOWSKI. It wouldn't be fair to the Air Force to answer that, sir.

Mr. HUNTER. Go ahead; be fair to them. Be unfair to them. It is important to have this interaction between industry and the unformed folks. Just be candid.

Mr. KOZLOWSKI. Let me put it this way. In any corporation, any operation, be it Congress or the McDonnell Douglas Corp., if your program is under control, it is a stable process, it is efficient and you are getting good value for the dollar, you don't need much oversight. You could probably do it over the video conference.

Mr. HUNTER. Do you think your program is at that point now?

Mr. KOZLOWSKI. We are very, very close, sir. In about another 6 months, everything should be concrete and proven with over a year of demonstrated performance in the bank.

Mr. HUNTER. Thank you. General Rutherford.

General RUTHERFORD. Sir, could I add just one thing?

Of course, the oversight requirements that we execute aren't of our own choosing in many cases. We are trying to implement legislation that was built up over many years; that has been translated into a very extensive pile of FAR's, Federal Acquisition Regulations, which we are obligated to live by.

Those drive, in many cases, the extent of the oversight and the number of people that are involved in that oversight process, not just within the Air Force, but also within the rest of the hierarchy that we are a part of. So, we have to work at the whole system if we are going to drive these costs out of this entire process.

Mr. HUNTER. Here is what we would like to see on the subcommittee. We would like to have a list, a memorandum, an inven-

tory, if you will, Mr. Kozlowski, of changes in terms of streamlining the process from your side, in your view, that could be made in changes in the law that might be needed to make those things effective.

Get those to the subcommittee and General Hawley, could you do the same thing from the uniformed side? What your perspective is in terms of streamlining this process, getting this cost down.

[The following information was received for the record:]

ACQUISITION STREAMLINING CHANGES.

The areas that Congress can be the most help in supporting streamlining activities of the C–17 Program are the following: authorize multi-year procurement for production Lot VIII—FY96 and beyond; eliminate funding "hooks" in authorization and appropriation bills; reduce GAO audits; allow tailoring of statutory warranty requirements; authorize and appropriate funds without appropriation category restrictions; waive statutory subcontracting goals for small and small disadvantaged businesses; and waive certified cost and pricing data requirements; allow alternative methods for assuring "good" cost information.

Mr. HUNTER. We are going to take a break. We have got two votes on. We will be back in about 15 minutes.

After this hearing is over, General Rutherford, a number of us are going to go to Mr. Skelton's office with you, we would like to go with you and let you tell us in classified form. We don't want to have to bring the whole committee back to vote to go into closed session about some of these requirements.

We will be back. We will suspend for about 15 minutes.

Ms. HARMAN. Mr. Chairman?

Mr. HUNTER. The gentle lady is recognized.

Ms. HARMAN. Could I, just for 10 seconds add one thing to what you said. I want to commend you for this line of inquiry, but suggest that as we enter the information super highway and so forth, there are other options for oversight besides having human bodies in a plant.

Fortunately, McDonnell Douglas, this McDonnell Douglas plant, is now in the modern age with computer aided design [CAD] Cam and so on and so forth. I would just suggest that we consider much more cost effective and less human intensive options for the future. This is a very promising line of inquiry.

Mr. HUNTER. I thank the gentle lady.

[Recess.]

Mr. HUNTER. The subcommittee will come back to order.

I might ask the ranking member of the full committee, Mr. Dellums has some questions. I know he has been patiently waiting and the ranking member of the subcommittee, Mr. Skelton, I think has some more questions. You passed on the first round, Mr. Dellums, go right ahead.

Mr. DELLUMS. Thank you very much, Mr. Chairman. I want to ask a few questions to round out the schedule. General Rutherford, perhaps you answered this question in response to the Chairman.

You indicated that the assumptions were virtually the same. Let me ask the question this way. I want to raise a question about basic objectives. Have any of the basic objectives of the mobility program changed since the 1992 Mobility Requirements Study? If so, what time lines, forces, warning times, et cetera?

General RUTHERFORD. I don't know if we are going to have time later on, but I would like to be able to address those in a closed session, if I might. I will be able to get in specific time lines and some of the specific data. I think it will be more useful if we might.

Mr. DELLUMS. OK. I don't know if this would be your same response to my second question and that is, what has changed since the January Mobility Requirements Study and the Bottom-Up Review Update that allows you now to reduce the cargo requirements for the two MRC's?

Is that simply a question of moving the goal post back from 1999 to 2001 or are there more substantive reasons than that?

General RUTHERFORD. A part of that is the strategy about the way you fight the war, sir. The other part is the considerations that go into PREPO. You PREPO more in the Bottom-Up Review and take credit for that. You don't have to lift as much.

Mr. DELLUMS. Let me take off on that last part then. Given the recent enhancements to pre-positioned forces, one might arguably expect that airlift requirements would go down. It seems to me that, that is indeed the case.

Yet, the Mobility Requirements Study Update recommends procuring a range of 120 to 140 C–17 equivalents, and why the increase over the major aircraft review's production objective of 120? One argued that it could go down because of the enhancements of pre-positioning. This now appears to ramp up.

General RUTHERFORD. I think it is a better definition of the requirements, sir, and fully understanding how we want to go about fighting two wars. That is what this is all about. We are looking at two MRC's. Will our mobility capability meet the requirement for two MRC's.

The additional Mobility Requirement Study really didn't address two simultaneous MRC's. It looked at both East and West, but not both near simultaneously.

Mr. DELLUMS. The C–17 was intended to ramp up to 12 aircraft per year by fiscal year 1995 when the 1992 MRS was done. If the procurement is slower and the C–141's are going to retire as planned, isn't it going to be a greater shortfall in aircraft capacity than originally projected?

General RUTHERFORD. Right now, today, sir, we have about 49 million ton miles out there today. We have got 48.8. The 141 retirement profile laid in on top of the C–17 procurement profile.

It does result in taking us down to about 47 million ton miles per day before it starts ramping back up to that 49 to 52 million ton miles per day figure. There is a small reduction but relatively very, very small.

Mr. DELLUMS. At what point does the ramp up get us back to where we—you are retiring the 141's.

General RUTHERFORD. Yes.

Mr. DELLUMS. That is going to create clearly a dip. You have got a ramp up of C–17's. At what point does your airlift now reach the point of a balance in equity?

General RUTHERFORD. With the current schedules, the program as is laid out right now, a bottom point of about 46.9 in the year 2000. We are back up at 2003 to 2049.

Mr. DELLUMS. Now, I have not had a chance to talk directly with Admiral Owens; simply picking up press accounts. Some press reports seem to suggest that Admiral Owens, who as you know is the vice chair of the Joint Chiefs, is concerned that advances in technology have not been adequately considered in the Mobility Requirements Study update.

For example, the United States replaced a large number of gravity bombs with smart munitions. Then it would seem to me that the lift requirement would become smaller. If the press accounts are accurate, were they taken into consideration? If so, how?

General RUTHERFORD. That was one of the subjects that was discussed at the conclusion of the bottom-up review. That is a discussion that needs to occur between the war fighting Commander in Chief [CINC's] and the Joint Staff and Admiral Owens in reference to how much they can reduce the size of the force, based upon new technology and therefore reduce the size of the lift.

I would not enter into that discussion since I am not one of the war fighters. Despite the fact that that came up it was the administration's position, Gen. Shalikashvili's position, to forward the report to the Secretary of Defense with the 49 to 52 million ton miles per day recommendation.

What I am saying is, yes, that was considered. It is a subject still to be discussed. As in any study, there are still some questions that lay out there to be addressed and this is one of them.

Mr. DELLUMS. The Bottom-Up Review Update analysis of aircraft capability versus requirements, as I understand it, used a fleet of C–17's with no non-developmental aircraft. I would like you to explain why that was the case.

General RUTHERFORD. What it used, sir, was equivalents. It used C–17 equivalents. In other words, I can carry this much this far in this amount of time. While it used the term C–17 equivalents, it could be an NDAA or a C–17.

Mr. DELLUMS. I understand that. Why were no nondevelopmental aircraft used? It was a C–17 equivalent, but you are saying you didn't need to use nondevelopmental aircraft as a part of the equation. Is that your major point?

General RUTHERFORD. The terms that were used in sizing the amount of the lift, you could substitute an NDAA or a C–17 into that number. It didn't make any difference. We were just talking about how much this airplane could deliver; whatever it was.

Mr. DELLUMS. I got you. You have explained it to me.

The Update Cost and Affordability Analysis used 102 C–17's and 19 nondevelopmental aircraft as the baseline case. Is that correct?

General RUTHERFORD. What did, sir; I'm sorry?

Mr. DELLUMS. Your Mobility Requirements Study Bottom-Up Review Update which you referred to as MRS BURU.

General RUTHERFORD. MRS BURU.

Mr. DELLUMS. I was trying not to do that.

Cost and Affordability Analysis from briefings that I have obtained said that in that exercise you used 102 C–17 and 19 nondevelopmental aircraft. I was asking was that the case and if that was the case, can you tell me the rationale or the justification? If that is non sequitur, then let's move on.

General RUTHERFORD. That was not the case, sir.

Mr. DELLUMS. How much was in the Air Force budget for the nondevelopmental aircraft in fiscal year 1996? Why was this money given up? As I understand it, it was about $400 million or so and then suddenly it disappeared. I want to understand what happened. What was the justification, the rationale, et cetera?

General RUTHERFORD. We can get you the exact number, sir, but there was about $400 million in the program for NDA which in the final moments when we were required to provide some additional offsets, that money was taken.

Mr. DELLUMS. Was I correctly characterizing the nature of your presentation that you were making your presentation as a compliment to an aggregate airlift force as opposed to in direct competition with the C–17?

General RUTHERFORD. Your explanation was extremely accurate and articulate, sir. I wish I had said it as clearly as you did. Clearly the 747 would be a compliment to, not an alternative to the C–17.

Mr. DELLUMS. Thank you.

Mr. HUNTER. Would the gentleman yield because I think that needs to be pursued a little bit?

Mr. DELLUMS. Happy to yield.

Mr. HUNTER. The mix here, if we have a mix, is going to be in question. That is going to be an issue; how many to how many. I think our uniformed panelist have testified, no that was you, Mr. Evatt, who said you can carry about 80 percent of what went to Desert Storm with 747's.

I'm just trying to get kind of a fix here because we are in the information receiving mode. Are you folks going to propose that this balance, if we have a mix of C–17's and nondevelopmental aircraft, you may propose to make that balance almost an even split in terms of tonnage carried. Is that right?

Are you positive of this proposition that you can carry 80 percent of what went to Desert Storm? That leads me to believe that you are not saying therefore we want to be 5 percent or 10 percent of this mix. We think we can be a big percent of this mix and do the job effectively.

General HAWLEY. Sir, if I could try that one.

Mr. HUNTER. This is a first. The uniformed side will answer the industry's question. We told you guys to stay out of the plants.

General HAWLEY. We are going to ask industry to propose against the whole array of C–17 force sizes; all the way from 40, which would assume that we don't buy any more beyond our current plan, all the way up to a number that would satisfy the whole military requirement.

They will have the option. They are using models that we agreed are good models to size what they think would be an appropriate compliment to each one of those C–17 quantities.

Mr. HUNTER. So, you are going to offer—I thank the gentleman for yielding and letting me ask this question. You are going to offer an array of mixes; right?

General HAWLEY. That's right.

Mr. HUNTER. Theoretically, those mixes could be heavily non-developmental aircraft. Mr. Kozlowski, do you concur that that's kind of your understanding of this? Obviously, you don't concur in hav-

ing a heavily weighted mix away from C–17. Is that kind of your understanding? Do you have any comment on this?

Mr. KOZLOWSKI. It is my understanding that that's the way the RFP is structured. I believe in your chart you have those different ratios; don't you?

Mr. HUNTER. Yes. I thank you. I just wanted to offer my friend, there is an element of competition here. I think it is going to be involved in the mix question.

Mr. DELLUMS. I clearly understand that. I was talking about the head to head approach. The gentleman was saying clearly his aircraft is not a military aircraft with unique military requirements. I think he said that very clearly on his part.

Mr. HUNTER. The gentleman's point is well taken.

Mr. DELLUMS. Thank you. Mr. Chairman, I would like to go back, General, because I certainly never want to come off as not prepared. I want to come back to my point.

I try to work hard to be prepared. In the unclassified portion of your Bottom-Up Review Update, under section 5, Mobility Requirement Study Bottom-Up Review Update Cost and Affordability Analysis, which is the question that I asked.

It says here, "Because the November 1994 DAB Defense Acquisition Board Review will determine the final mix of C–17 and nondevelopmental aircraft, the cost analysis for the Update was based on a nominal mix of C–17 and nondevelopmental aircraft based on a ratio of 102 primary aircraft authorized, C–17, to 19 primary aircraft authorized, nondevelopmental aircraft; same ratio as the Air Force."

These numbers didn't come out of the sky. These are in your document. I was simply asking why that particular mix was the thrust of my question. Your response was, we didn't use that. But it says here that you did. I'm not trying to be tricky. I just don't like to come off as uninformed because we work hard to try to be informed.

General RUTHERFORD. I'd have to look at it, sir. I am sure you are obviously right. The Bottom-Up Review Update is talking about 2001. That is the baseline force for it at that time. There is no program, in my estimation right now, to get us to that date. Our given program for 120 C–17's, if that's all we bought without any mix, it is 2006. I need to look at it, sir, to be able to address the question. As I recall in the study what they have used is 88 C–141's to do the analysis on the lift and 55 C–17 equivalents. Those are the numbers that I remember.

Mr. DELLUMS. It says here on table 5–1, the cost of aircraft options and it lists a number of options. At the very bottom it says, "All options assume a ratio of 102 C–17's and 19 nondevelopmental aircraft." So, these are where the figures came from.

Every one of these options, Mr. Chairman, assumes those numbers. I was simply trying to understand the intellectual, the strategic, or the tactical basis for why that particular set of numbers.

General RUTHERFORD. I am thinking about requirements. You are thinking about the costing that went into the study. Frankly, I haven't spent much time talking about the cost in this study because in my mind, it is not a big issue in that particular study. I am sorry.

Mr. DELLUMS. We were talking past each other on this particular point. You can just answer that question for the record.

General RUTHERFORD. I would be glad to.

Mr. DELLUMS. I am sorry if I caught you off-guard; no big deal. We will figure that one out.

[The following information was received for the record:]

The 102 Primary Aircraft Authorized (PAA) C–17's to 19 Non-Developmental Airlift Aircraft (NDAA) ration was derived from the Air Force's projected procurment of C–17's and NDAAs. The numbers are programmatic only and do not reflect a final force mix decision. Use of this ratio was intended to provide a consistent basis for costing of the various mobility options. The Strategic Airlift Force Mix Analysis (SAFMA), being released later this year, will recommend the actual C–17/NDAA mix.

Mr. DELLUMS. Mr. Chairman, just one last question on the sealift approach. Does the Bottom-Up Review update support the Marine Corps goal of adding more maritime prepositioning ships to its current fleet of 13?

Congress appropriated funds to add one more ship in fiscal year 1995. Does the department plan to request the money for the other two? If so, when? If not, why not? That would be my last question, Mr. Chairman.

Admiral QUAST. You are talking about the Bottom-Up Review, MRS BURU, again?

Mr. DELLUMS. Yes.

Admiral QUAST. I have not seen that document, sir. So I am not sure if it does. I will take it for the record and will check it out. I know it has been signed. It has not, to my knowledge, been distributed.

[The following information was received for the record:]

The Bottom-Up Review Update does comment on the Maritime Prepositioning Force Enhancement Program; however it does not make any recommendation towards acquiring additional ships to support this program.

The Joint Staff is reviewing the requirement for two additional ships for the Maritime Prepositioning Force Program. The requirements for these ships will be briefed to the Joint Requirements Oversight Council for validation sometime in the future.

Mr. DELLUMS. OK. Thank you very much, Mr. Chairman. You have been very generous.

Mr. HUNTER. I thank the ranking member of the full committee. We want to thank him for hanging with us throughout this subcommittee hearing.

Mr. Tiahrt of Kansas and then the gentleman from Mississippi.

Mr. TIAHRT. Mr. Chairman, I want to thank you for allowing me to participate in your committee here on procurement.

I want to emphasize what the gentleman from California, Mr. Dellums, talked about. When you talk about an NDAA account, it is not a comparison of the C–17 to a 747. I am sure in fiscal year 1996 terms, we are talking about $300 million versus $150 million for a 747.

If Mr. Kozlowski was required to compete on the commercial haul environment, I think you would have as much difficulty doing that as Mr. Evatt would have trying to meet C–17 requirements with a 747.

So, there is not really a comparison there in one sense of requirements. Ultimately there may be some type of a comparison when you get down to the mix. If you look at the first 30 days of Desert

Storm, for example, that you can justify a full contingency of C–17's meeting that need any more than you can justify a full contingency of some other NDAA aircraft like a 747. Even though there are some things like survivability that we have done to the 747 for our Commander in Chief. We have some things in place so that we can at least have some type of survivability.

It is obviously a combination. I would like to emphasize that when you talk about NDAA, let's not impose a bunch of milspecs on a commercial aircraft. One of the frustrations I have seen from coming here my short stay has been that we talk about going to best commercial practices, about adopting the off the shelf items for our military procurement, but we don't follow through with our Federal Acquisition Regulation [FAR's] and our Defense Acquisition Regulation [DAR's] as far as changing the documentation.

We end up with 120 or 200 representatives in plant versus one; the comparison we heard earlier. I know there does need to be some oversight. I do know that the oversight was driven by Congress when we talked about a $700 or $800 pair of pliers and all of those other things that I think were misconstrued.

In the mobility requirements study which I think is due next November, is there a view of the first 30 days or the initial requirements for airlift capability? The 80 percent, 20 percent of the load that was talked about by Mr. Evatt, perhaps that doesn't all fit in that 30-day window.

Is that part of the requirement of the study? Is there a 90-day or a sustaining function? How is your RFP structure? Not having the benefit of a seeing your RFP, I don't know exactly what you are looking for.

Is that a part of the requirement that you are looking for in your study. General Rutherford, are you familiar with the RFP enough? Can I ask that or shall I submit it for the record?

General HAWLEY. What we are doing is using the models, what is called a mass model. Actually, it is General Rutherford's model that is being used to help us with this problem of what is the right mix.

These models are very detailed. They go down to the piece of equipment level. Rather than just talking about how many tons can we move of what category of cargo, they are actually deploying a force. So, we have a specific force structure that we are working the models against in order to deploy in a timeframe so that we know what needs to go in the first week, in the second week, in the third week.

The model runs through and sees which mix of aircraft will be the best to get that force deployed into the theater as opposed to the longer term sustaining problem where you just get into hauling the supplies that need to support that initial deployment of force structure.

We think this is going to be a very rigorous analysis. It will provide the kind of answer that you are looking for, which is how much of that airlift force needs to have a military characteristic in order to get the job done that General Rutherford is responsible for?

Mr. TIAHRT. Are you also including, we saw a chart about refueling requirements?

General RUTHERFORD. As I recall in the early stages of Desert Storm, we were not only transporting through C–141's and other larger aircraft, we also had a large contingency of fighter aircraft that were being transported across the Atlantic.

That has a tremendous drain on resources for tankers. I know having Air Force Reserve at McConnell Air Force Base that does refueling, I am sensitive to that. We have Air National Guard units in Topeka, KS. I know that there is a tremendous drain.

We saw a lot of our Kansas boys go overseas to take care of that refueling requirement. Is that part of the study when you look at a C–17 how much it has to be refueled; when you get an NDAA how much it has to be refueled, what drain there is on the system? We do have a finite number of tankers.

General RUTHERFORD. That is a part of the Mobility Requirement Study Bottom-Up Review that we have been referring to and it has been looked at.

Mr. TIAHRT. An interesting point was brought up Mr. Chambliss when he talked about the C–141's going away more quickly than C–17's are coming on-line. In the long-term that may not be a problem. In the sort-term I think we are, as you say, at some risk in our two theater scenario.

Wouldn't this NDAA help satisfy your requirements as far as having lift capability in a shorter amount of time than waiting for a long period of delivery of 120 C–17's, for example. Wouldn't there be a schedule advantage as picking something off the line at some commercial airline manufacturer?

General RUTHERFORD. Yes, just like I think if the decision was one to proceed with the C–17 program faster, you could do the same there, too. You could build more C–17's than the eight that we are talking about per year. That is what we talked about earlier.

Yes, if it is the right mix. Whatever we buy, we need to make sure that it is capable of doing the job. I think that is far more important than getting another million ton miles per day right away.

Mr. TIAHRT. The study does not include cost or is it just looking at the mix or does it include some kind of cost, life cycle cost, supporting cost?

General RUTHERFORD. Cost effectiveness is the purpose of this strategic airlift model analysis that will occur this summer; cost and effectiveness.

Mr. TIAHRT. We are very cost conscious, this Congress is, as well as other downsize requirements you had before we came to town. I am sure that you are sensitive to that. Scheduling costs are related. The longer the schedule the more the cost.

I am reasonably satisfied with the RFP. Is it released within the next week or two?

General RUTHERFORD. Tomorrow.

Mr. TIAHRT. I would like to request a copy be sent to my office, if you can allow that. It is not classified or anything.

General RUTHERFORD. OK.

[The following information was received for the record:]

The Secretary of the Air Force, Office of the Assistant Secretary (Acquisition) provided a copy of this RFP directly to Mr. Tiahrt's office.

Mr. TIAHRT. Again, Mr. Chairman, I thank you for the opportunity.

Mr. HUNTER. I thank the gentleman from Kansas.

The gentleman from Mississippi is recognized.

Mr. TAYLOR. Thank you, Mr. Chairman, for staying around as long as you have. I want to thank the panel for staying as long as they have.

Mr. Vortmann, let me begin by complimenting you on your testimony, although I represent two of your major competitors, I think what you have to say, all of them would be very much echoing your remarks. On their behalf I wanted to say that.

I want to open my questions to Admiral Quast because one of the things I have—market competitively for commercial ships, what we call the second tier shipyards, have done comparatively well. They actually export vessels in a very competitive international market.

One of the things that we export and are very competitive on are large ocean going barges that carry containers. If we are competitive, it must mean that we can build these things for a good price.

The question would be, given the limited dollars that you have to acquire pre-positioned ships, has the Navy given a serious look at interoceanic barges for pre-positioning purposes? Since you are not buying a power train, it is obviously going to be a heck of a lot cheaper than a fully rigged cargo ship of whatever variety.

Admiral QUAST. The interest of Admiral Owens, as Mr. Dellums indicated he is deputy or the assistant vice there to the chairman, on the mobility offshore base has a lot of this material, thought, and concept involved in his trail.

He has got this big model outside of his office in the Pentagon. So, we have had some discussions on what kind of barges those things might represent. We have been contacted by a number of organizations who are building these barges.

We are just now beginning to look at what is in the marketplace. There is no study that I know of, no directed effort other than to kind of do a survey of the barge marketplace.

Mr. TAYLOR. Admiral, wouldn't again, in an ideal world, this committee would provide the funds for a fleet of high speed ships capable of carrying any vehicle in the inventory. Unfortunately, it is not an ideal world. We have a very small procurement budget this year and again next year.

Since we can't do everything we would like to do, my request is that you take a look at that, at least doing those things that we have to do, in the most cost effective manner. Again, if we are able to sell these things in an international market, we must be very competitive.

To the best of my knowledge, all of the second tier shipyards are exporting vessels. They are obviously very cost competitive. My second question would be to Mr. Evatt. You talked about changing the configuration of the 747 in order to handle larger cargos. I unfortunately had to leave the room when you spoke about the cost differential.

That would be the first question. Where is the cost differential? The second one is, do you actually have a working prototype that is available for the Air Force so they can see if this in any way meets their needs?

Mr. EVATT. Sir, last year in August they conducted an experiment, if you will right off the production line 747–400, and put a great deal of Army equipment on that particular vehicle. So they had some appreciation for how they compute what comes off the production line today.

As far as a working prototype of an aircraft with a larger side door or a strengthened floor, we will no doubt provide that kind of engineering detail in our upcoming proposal to the Air Force for the NDAA program. We have no working prototype at this time.

We do have engineering data to support what we think that revised configuration would be. We stated earlier that there wouldn't be any separate modification. Any changes would be done in line to the production of the aircraft just like all of the other variations to the 747 freighter, depending upon what the individual customer wants.

Depending upon the final configuration that the Air Force would choose, based on everything we know today, it would probably vary our catalog price no more than 10 percent, probably less. The final price of course is depending upon the number that are purchased, the rate at which they are purchased; a variety of factors.

Mr. TAYLOR. General Rutherford, there is obviously some interest on the part of a number of Members on this committee. I don't know if it is the majority, but a number of us when looking at the dollars of the 747 and the capabilities of the 747 compared to the C–17, we do see that for a large percentage of what is shipped to a contingency, the 747 would be more than adequate, if not better.

Does the lack of a working prototype from Boeing make it harder for you to make a decision, a good decision, as to whether or not which would due for your needs? I am going back to my experience with the C–17.

We have had now, myself, 5 years of testimony on what the plane is capable of. In many instances what we were told would happen did not happen. I have gotten a little skeptical about every vendor.

General RUTHERFORD. I don't want to get into the acquisition business. I will give General Hawley the opportunity to respond to this. The 747 has been around for a long time. It is a fairly known quantity. In many ways it is a good airplane.

The proposals, as I understand them, and we will have to get some feedback from the RFP, are not major to reinforce the floor and cut a bigger door. That does not seem to be a major undertaking. Dick, do you want to address that?

General HAWLEY. The basic answer is I don't think that our decision will be handicapped in any way by the absence of a prototype. We think that the engineering work that will be submitted will be sufficient to support the decision process.

Mr. TAYLOR. What about the additional weight necessary to beef up the floor? How much does that throw your equations off? Is that a big deal or not a big deal?

General HAWLEY. Certainly weight affects the performance characteristics of the airplane. Again, when the RFP submittal comes to us that will be included. So, we will be able to include that in the models and make sure that we have the appropriate analysis complete before the decision is made.

Mr. TAYLOR. Mr. Chairman, I will yield back my time, but I do want to thank you for having this hearing.

Mr. HUNTER. I thank the gentleman. The ranking member is recognized, Mr. Skelton.

Mr. SKELTON. Everything is driven by requirements. Is that not correct, General Rutherford?

General RUTHERFORD. Yes, sir.

Mr. SKELTON. I get the distinct impression that the real requirements for what we are talking about this whole business today you are kind of fuzzy. You used the phrase better definition of requirements. My gosh, you have, I'm looking at two MRC's. You have the experience of Desert Shield and Desert Storm. You had the threat of North Korea acting up last year and I know a lot of planning went into that.

I am bothered by this that we are having a hearing here with a lot of effort on your part and other parts and we are not really clear on what the requirements are. Are you really—am I misreading that, that the requirements are fuzzy?

General RUTHERFORD. To the extent that we are talking about an airlift force that is going to the job for this Nation for the next 30 years, and the number of assumptions associated with what that force ought to look like and where it might be employed, there are different views about what the requirement is. To that extent, yes, sir, they are fuzzy. I think we have attempted to in the mobility requirements study to lay out what we perceive to be the scenarios that we have received for two MRC's right now and to attempt to size that in terms of airlift and sealift.

Mr. SKELTON. You have no doubt revised your definition of requirements in recent days; have you not? When you used the phrase "better definition of requirements."

General RUTHERFORD. I'm sorry, sir. I don't know what comment you are referring to.

Mr. HUNTER. I think the gentleman is referring to your second Bottom-Up Review. The requirement changes that we talked about that I listed off to you when we started the hearing. This was called the mobility requirement study Bottom-Up Review update and there was a change in about four or five assumptions and a change in two or three results. You said you wanted to get into those.

General RUTHERFORD. Yes, sir.

Mr. HUNTER. That is what the gentleman is referring to, I believe. We will go into those when we get a chance here.

Let me get a few questions on the record here, General. I thank the gentleman from Missouri. It appears that the adjusted Bottom-Up Review assumes a Reserve air lift fleet, stage III, is available for the two nearly simultaneous MRC scenario. Is this a change from the MRS?

General RUTHERFORD. Yes, sir, I believe it is. I wasn't around when the MRS was done, but the MRS BURU, the use of stage III is contemplated.

Mr. HUNTER. Won't these aircraft tend to be less efficient and clog the airline system due to extensive ground throughput times?

General RUTHERFORD. Yes, sir. That's possible. It depends upon how you use them from one scenario to another scenario. I'm not

saying in the first MRC, for example, that stage III would be used. If you go into another MRC, it could be used. I would like to address that in the following session, if I might.

Mr. HUNTER. OK. General Rutherford, why do you use such phrases in your statement, this is your prepared statement, as "the NDAA offers potential for a less costly option for general airlift" and "I fully support the analytical efforts of the adjusted BURU and SAFMA to quantify the most cost effective solution to the aircraft mix?"

Will you oppose any solution that includes NDAA?

General RUTHERFORD. No, sir. What I am attempting to say in that statement is, I believe that the ongoing process now will lead us to the correct decision on mix, at the appropriate cost.

Mr. HUNTER. General Hawley, what does the NDAA draft request for proposal indicate about NDAA procurement funding?

General HAWLEY. It includes a funding line. As you know, all of the strategic airlift funding is in one line from 1997 out. I am not sure what the dollar is or dollar flow is for that. We have given the contractors a notional funding line against which they can propose. I would be happy to provide that for the record when we submit the RFP.

Mr. HUNTER. OK.

[The following information was received for the record:]

STRATEGIC LIFT

(The information follows:)

The following instructions and funding table appear in the NDAA RFP:

"Aircraft fiscal year procurement funding guidance. For the government FY96-01, the offeror shall propose a most probable NDAA procurement program at the maximum NDAA quantity using the aircraft procurement funding constraints listed below in the Cost Table. Procurement funding will be used by the government to fund the aircraft contract, and support equipment and initial spares in the logistics support contract. The remainder of the logistics support contract will be funded with operation and maintenance (O&M) funds, which for the purposes of this solicitation may be assumed to be unconstrained. The procurement quantities proposed must be fully funded buys, or options to buy, with exception -- the offeror is to propose no less than one NDAA aircraft per fiscal year buy. Should the price of a single aircraft exceed the available funding in any year, assume that the funding can be increased to accommodate the single aircraft price in that year. For FY96-05, total requirements for NDAA aircraft and procurement funded support elements are limited to the funding amounts in the Cost Table below.

C-XX Procurement Contract Funding Guidance TY$ in millions

C-XX	FY96	FY97	FY98	FY99	FY00	FY01	FY02-03
Qnty	TBP	TBP	TBP	TBP	TBP	TBP	TBP/YR
Notional Procurement Funding:							
C-XX	$183	$200	$200	$1220	$880	$695	$2000/YR
(C-17s: 120, 132, 100, or 86)							
C-XX	$183	$200	$200	$1220	$1220	$4000	$4000/YR
(C-17s: 72)							
C-XX	$183	$200	$200	$2900	$4000	$4000	$4000/YR
(C-17s: 58)							
C-XX	$183	$2540	$2660	$3910	$4000	$4000	$4000/YR
(C-17s: 40; C-5D: 0)							
C-XX	$183	$1000	$600	$600	$600	$600	$600/YR
(C-17s: 40; C-5D: 30)							
Most probable O&M Funding							
	TBP	TBP	TBP	TBP	TBP	TBP	TBP/YR

TBP: To be proposed

Notes: Assume $83.3M of FY94 3010 funding is available for obligation
Assume funding for a minimum of one C-XX aircraft per year
At the 120 & 132 Breakpoints assume one squadron C-XX
(18 TAI, 16 PAA)"

Mr. HUNTER. Mr. Evatt, do you know the answer to that question?

Mr. EVATT. In the draft, sir, I don't have the draft document here. I couldn't give you an accurate answer without reference to it. We could certainly provide that for the record.

Mr. HUNTER. Please do that if you could.

Admiral Quast, what are the results of the recently completed study of the costs and benefits of national defense features in an active Ready Reserve force?

Do you prefer the ongoing acquisition of used foreign built vessels for the RRF to incorporate national defense features as opposed to incorporating national defense features in new commercial ships?

Admiral QUAST. We looked at both. There is a study out on the latter one that you referred to. The mobility requirement study lays out a requirement that we get the RO/RO's that you are referring to in as quick a period a time as we possibly can. When there is none available and if you are going to start building them, you are looking at three to 4 years which exceed the timeframe.

We do support going out on the market whether they are United States or foreign to get them so that we can get that surge. As I indicated there were less than 50 percent in the surge capability right now.

Mr. HUNTER. Let me ask you a related question. Mr. Vortmann brought up the fact that if you keep doing this, in his estimation, buying foreign, you are going to push out into the future the capability or the possibility of ever acquiring adequate industrial shipbuilding capability in this country.

Isn't that a valid argument?

Admiral QUAST. Yes, sir.

Mr. HUNTER. You keep buying foreign, you are going to get hooked on them.

Admiral QUAST. Yes, sir.

Mr. TAYLOR. Mr. Chairman, along that same line, sir?

Mr. HUNTER. Sure.

Mr. TAYLOR. The admiral made a statement that I don't think is entirely accurate in that at the time that this came up last fall as a part of the defense conference on the defense authorization bill, a statement was made that we have to go out and get these ships foreign because nothing is available domestically.

At which time, the Armed Services staff contacted MARAD and found out that we did indeed have SL–7, the sea/land ships that were purchased for this country in Ready Reserve status that could have been used for that purpose while ships were built domestically.

I have pointed this out privately to the Admiral. I will point it out publicly to the committee. That is not accurate. We had ships available. It is one more reason those ships should have been built domestically. I yield back.

Mr. HUNTER. Admiral Quast, what do you say about that?

Admiral QUAST. Well, in a conversation that I had earlier in the week with Admiral Herberger whose is MARAD, he once again reiterated they have recently took a look at the market. There were

a handful of United States RO/RO's, one of which looked like it might be worth going after in the acquisition.

Mr. TAYLOR. Admiral, I'm talking about the ships that are a part of the National Defense Fleet that have already been paid for by the American taxpayers and were used very well, I might add, during Desert Shield and Desert Storm for the immediate need.

We made this point. As a matter of fact, this committee was insistent on buying American. Unfortunately, our Senate colleagues would not sign the defense authorization bill, as I recall, unless we purchased the foreign ships.

Mr. Chairman, I say this only, I compliment you for your stance and to reinforce your stance. I thank you.

Mr. HUNTER. How many ships is the gentleman referring to?

Mr. TAYLOR. If I'm not mistaken, the SL–7's, around 8 or 10 of them.

Mr. HUNTER. You are talking about the fast sealift ships?

Mr. TAYLOR. Yes, sir.

Mr. HUNTER. That's a part of our surge capability. They already there. That's already added into the less than 50 percent capacity that we have, which is why we want to get out and get more.

Mr. TAYLOR. Admiral, with all due respect, you said you had immediate need. We have ships tied up that could fill that immediate need.

You have also admitted, with all due respect, that the world RO/RO market is available because they are not a commercially viable ship. They are a great military ship, but they are not commercially viable, and that you can lease them any time you want.

If we had an immediate need, we fill those with ships that the taxpayers have already purchased that we know work because they worked in desert storm. If you have a surge need, then you go out into a market where these ships are tied up because they are not commercially viable.

Again, I want to compliment the chairman for his relentless, pursuit of this. I think this needs to be said. I think the Navy does a wonderful job of being war fighters. I would think we could do a better job of being businessmen. That's what I'm asking you to do.

I appreciate the chairman for yielding to me.

Mr. HUNTER. I thank the gentleman. Let me ask Mr. Vortmann to respond. Could we accelerate domestic commercial construction of these RO/RO's?

Mr. VORTMANN. The industry would be capable of producing more strategic sealifts in a shorter period of time if it was asked to do such. We are not capacity constrained.

Mr. HUNTER. How much could you accelerate your schedule? If you are going to look at the decision that the Navy made that was supported strongly, obviously, by the Senate, where would be the point of your criticism?

Admiral Quast says we had to have them and we had to have them quickly. We had to go foreign.

Mr. VORTMANN. I would concur with the Admiral's statement on the low end. If we are looking at up to 3 years for a yard to take on a new contract to build.

Mr. HUNTER. We are talking about the big RO/RO's. Admiral Quast, you are talking about the little RO/RO's?

Admiral QUAST. The surge which is where our RO/RO's are and we have got 22 of them there, these are the ones that Mr. Taylor is referring to. We are trying to up that total number to 36. We have 5 vacancies in that number.

Mr. HUNTER. You are buying how many foreign?

Admiral QUAST. Well, there are only five opportunities. Whatever is offered, we are going to look at it. Right now, because of the market survey that we have done, it looks like most of them will be foreign because that's the only thing that's available.

Mr. HUNTER. Mr. Vortmann, you take issue with that; with the purchase of foreign?

Mr. VORTMANN. No, I don't take issue with that. On the used ship market, I'm sure the Admiral is correct that the availability is going to be foreign built ships. The alternative would be to build domestic.

Mr. HUNTER. That's what I'm saying. You take issue with the plan to buy foreign instead of building domestic.

Mr. VORTMANN. Very much so. It think it is short sighted. There is a short-term need, obviously, they are trying to full. I think in an attempt to solve that problem, if we factored it in to the much bigger problem that we face of not being able to have enough volume in the naval shipyards to maintain the capacity that the Navy is going to need in the future.

Mr. HUNTER. What is your answer when the Navy says, we have got to have this. We have got this immediate surge gap? How would you answer that? How do you think we could take care of that gap and build domestically?

Mr. VORTMANN. I can't speak to the immediate need. If the need is immediate, a new building will not satisfy an immediate need. It is going to take 2 to 3 years to build a ship.

Mr. HUNTER. I understand.

Mr. VORTMANN. That ship will give you 2 to 3 times the capacity of what you were referring to, the small RO/RO that they will buy on the foreign market. It will take 2 to 3 years to get it on board.

Mr. HUNTER. The Study on National Defense Features states that such a program:

> Should be predicated on first achieving the higher priority MRS requirements. Acquisition of 19 LMSRs and acquisition of the remaining 7 RO/RO's for the inactive RRF by 1996.

Admiral, how is the latter objective to be achieved and how many of these RO/RO's are not funded in the future year's defense program? How can they be high priority if they are not funded? The number 7 is now 5. MARAD just purchased two about 1 month ago or within the last month or so. They will become available to us in the RRF when they are outfitted to U.S. standards which will be in the next fiscal year.

The total number of 36 does not change. That is a part of this study, but the number of remaining opportunities to fill it are now 5. As far as the funding line goes, as you probably know, that was funded in previous years by the Department of Transportation.

DOD has just recently picked up on that. It should be. It certainly is in the President's budget for fiscal year 1996 for the addi-

tional $70 million to buy 2 to 3 RO/RO's, whatever $70 million buys us.

Admiral QUAST. But the rest of them aren't funded.

Mr. HUNTER. That would give us an additional two or three.

Wait a minute, but the rest of them are not funded. We need five more; right?

Admiral QUAST. Yes.

Mr. HUNTER. You are only funding a couple; right?

Admiral QUAST. Yes, sir.

Mr. HUNTER. You just told us we can't build these things domestically is because of this urgent need. I think a reasonable question from the committee is, if the need is so urgent, why aren't buying five of them?

Admiral QUAST. We will buy five and it will be in the future budget. As I say, the Navy has just gotten the tasking to develop this because it is a DOD line item.

Mr. HUNTER. I guess, Admiral Quast, if these aren't so urgent that we don't need them all as quickly as possible, you move closer to Mr. Vortmann's argument that we might as well build them. Does that make any sense?

Admiral QUAST. It makes sense, yes, sir. Remember last year we had $158 million for acquisition to do exactly what you are saying. That was rescinded by the 103d Congress in the lean months.

Mr. HUNTER. That's not the point. Regardless of what stops or what slows this process down, if this isn't going to be an immediate sense of urgency was created by the Navy. They said, we have got to rush out and buy these.

Therefore, we have got to buy foreign because, oops, we looked around and there aren't any domestic ships available and we can't build them. For a variety of reasons, this urgency is going away. The urgency is the only argument you have against building them domestically. So, I am saying in light of the fact that this urgency seems—why not build them?

Admiral QUAST. The urgency, sir, is not rescinded. We are still trying to get there by 1996 as stated in the letter that you read on the National Defense Features Act; that this is what we are pursuing. As far as the funding line is concerned, I think it is just a matter of the Navy putting it in and its time. We just got it as a line item to fund.

Mr. HUNTER. How long would it take Mr. Vortmann to build these ships instead of buying them foreign?

Mr. VORTMANN. The Admiral or me.

Mr. HUNTER. You.

Mr. VORTMANN. I would submit that the industry; the two existing yards that are building new construction I think in the 3 year period could each put out one more ship. There were two other yards, Mr. Taylor's constituents that were very disappointed they didn't participate in this program, that they would be capable of putting our ships in that 3-year period as well.

Mr. HUNTER. So, how fast could we have these ships if we built instead of bought foreign? I'm trying to figure out the difference here in schedule. We need five more ships; right?

Admiral QUAST. Yes, sir.

Mr. HUNTER. How fast could we build these ships if we authorized them fairly quickly, Mr. Vortmann?

Mr. VORTMANN. The five ships that the Admiral will be buying would be covered by, at best, two ships that we would build because of the size differences. That gets you to your big and small RO/RO. What we build are big. What he buys, because of the commercial marketplace, are small.

Mr. HUNTER. So, you only need a couple of the big ships to make up for these little foreign buys.

Mr. VORTMANN. I believe that to be true based on the square footage.

Mr. HUNTER. These are mazdas; right? Is that right, Admiral Quast?

Admiral QUAST. The five RO/RO's that we are trying to acquire in the immediate, these are small and I think they are based on 150,000 square feet.

Mr. HUNTER. So, the big ones that are American yards are building are how big, Vortmann?

Mr. VORTMANN. Close to 400.

Mr. HUNTER. So, they are more than twice as big. So you wouldn't have to buy to build 5 American ships to make up for the foreign buys. You would do instead two or three. How fast could we have those two or three?

Mr. VORTMANN. Within 3 years.

Mr. HUNTER. What is the cost differential?

Mr. VORTMANN. The cost differential is going to be very sizeable because you are comparing an apple and an orange.

Mr. HUNTER. Explain that in terms of tonnage because you are going to get two for one basically.

Mr. VORTMANN. We are going to get two for one. The one that you have now that is comparable to the two commercial ships has much more capability, flexibility in terms of load out capabilities, self-contained with a LO/LO capability as well as a RO/RO capability, lift-on, lift-off with crane capacity. It has much more environmental capability to protect some of the equipment that the General mentioned that is sensitive to being stored on board a ship for a long period of time. You get what you buy from a commercial ship. You have limited capabilities to upgrade that.

Mr. HUNTER. Admiral Quast, have you looked at this cost question?

Admiral QUAST. Yes.

Mr. HUNTER. If you buy one American bit RO/RO, it is about two and a half times as big as the little RO/RO. Comparing them from a tonnage point of view, what are you spending for these spending for these foreign ships?

Admiral QUAST. The two that are MARAD just purchased a month ago from the marketplace, two for $43 million. In the 1996 budget that we are requesting you support, for two of the LMSR's we are requesting $596 million.

Mr. HUNTER. Mr. Vortmann, if we can buy two foreign for $43 million, the two for one sale we talked about, that's a little bit smaller than the capacity of your one large RO/RO. What is your large RO/RO?

Mr. VORTMANN. I concur with the Admiral. The number is probably $250 million to buy the one large ship tailor designed to the military needs, compared to the two that are $40 million or $50 million.

Mr. TAYLOR. Would the Chairman yield?

Mr. HUNTER. I would be happy to yield.

Mr. TAYLOR. Thank you, Mr. Chairman. I think there are a couple of other things that need to be included in this equation. When you purchased that ship for approximately $22 million, your expenses have just begun. It has got to be converted. The decks have to be strengthened in order to make them strong. The ramps have to be strengthened. It has got to be converted to be useful.

Number two is, we don't know exactly the age of those hauls, but an average haul you are going to get 25 to 30 years out of. So, if it is already 10-, 15-, 20-years-old, it is on the down slope whereas a new ship, the clock only starts running when it is commissioned.

Mr. HUNTER. Would the gentleman yield on that question?

Mr. TAYLOR. Sure.

Mr. HUNTER. How old are these?

Admiral QUAST. I believe the two that we just purchased were somewhere around 7-years-old each.

Mr. HUNTER. They are 7-years-old. You have got to put a significant amount of money into conversion. How much?

Admiral QUAST. Total, at about $30 per; $30 to $35 million at the upward end would be the maximum that we would spend on both the acquisition to purchase and the updating it to requirements.

Mr. HUNTER. So, that kicks you up to over $100 million.

Admiral QUAST. $35 million for each ship.

Mr. HUNTER. So that is $70 million plus the $43 million initial to purchase. You are up to about $110 million at that point; right?

Admiral QUAST. $35 million and $35 million, that's $70 million and we have $70 million in the budget; yes, sir.

Mr. HUNTER. But that is $70 million. That's for upgrading; right?

Admiral QUAST. No, no. That's for the purchase and upgrading of those two.

Mr. VORTMANN. Mr. Chairman, I would submit you are still comparing an apple and an orange.

Mr. HUNTER. OK.

Mr. VORTMANN. For example, a new designed ships are twin engine, twin screw, for additional redundancy and survivability. We heard some discussion earlier on the aircraft and the need for that. The same exist out at sea.

I am assuming, Admiral, that the ships you are buying in a commercial fleet are single engine; single screw.

Mr. HUNTER. Is that right, Admiral?

Admiral QUAST. I'm not sure. I'd have to check.

Mr. HUNTER. Go ahead.

Mr. VORTMANN. There is just an ongoing number of issues on where there are differences between a new ship and a used existing ship. There is no question that a used foreign ship is going to be cheaper because it was originally built in a subsidized foreign shipyard to begin with. That is part of the root cause of why there isn't sufficient volume in the American shipyards to make up for the demise of the Navy building program.

Mr. HUNTER. Go back to the first question we asked. In terms of time, at what date, Admiral will you have all five of these foreign ships in the water, converted and ready to go, all five of them? What calendar date?

Admiral QUAST. I would say by 1997.

Mr. HUNTER. OK, 1997. January 1997; mid-1997?

Admiral QUAST. Somewhere in 1997. We will have a total of 36 RO/RO's.

Mr. HUNTER. I want to foreign buys. You think we will have those five foreign buys purchased, converted and in the water operating for the United States in 1997.

Admiral QUAST. Fiscal year 1997.

Mr. HUNTER. Fiscal year 1997 or calendar year 1997?

Admiral QUAST. Fiscal year 1997.

Mr. HUNTER. Mr. Vortmann, if we built those in the United States, when would they be in the water?

Mr. VORTMANN. It would take at least 3 years to start.

Mr. HUNTER. OK, so you take 3 years. At that point, you would have the total tonnage equivalent that you are getting with the five foreign built? So, that would be 3 years. That would be fiscal 1999; right?

Mr. VORTMANN. Yes.

Mr. HUNTER. So, you got basically 2 years' difference in terms of when you are going to have this lift. Is that reasonable, Admiral Quast?

Admiral QUAST. Yes, sir.

Mr. HUNTER. I think we have exhausted that line of questioning. Thank you.

We have a couple of other questions here. Admiral Quast, how are the ongoing negotiations going with the third Marine Prepositioning Ships [MPS] contractor? Do you see the possibility that MPS ships are going to have to be purchased just to retain the current capability? If so, tell us how much. How will this situation affect the LMSR procurement?

Admiral QUAST. First of all, the LMSR procurement is the No. 1 goal in the sealift fund and that is where the money is going to go. Relative to the discussions of the third contractor involved in support of the MPS, we have not reached a negotiated position.

Still an undetermined difference between what we are asking for which is in line with the other two contracting companies involved. This is where the negotiation has been to try to bring them in line with the renegotiated contractors. The two other contractors have come down. The third one continues to hold up.

Mr. HUNTER. I guess the question is, are the MPS ships going to suck up all of the money?

Admiral QUAST. No, sir.

Mr. HUNTER. How much are they going to cost us?

Admiral QUAST. We don't know for sure.

Mr. HUNTER. Well, then we can't be too certain about that.

Admiral QUAST. It still could be negotiated. That is why I'm really not—I don't do the negotiating. I would hesitate to say what it is going to be. It is a sum of money that is less than $300 million.

Mr. HUNTER. How much?

Admiral QUAST. Less than $300 million to buy the equity on five ships, will then turn around and bring back about a billion dollars to the taxpayers of our country. That's what we are talking about.

Mr. HUNTER. You can say to a certainty that this situation will not affect the LMSR?

Admiral QUAST. That's correct.

Mr. HUNTER. OK. Let me go back to General Rutherford.

General Rutherford, you are in charge of lift. I think the ranking member made an accurate statement when he said, the foundation for this entire hearing on this issue, first the division between sealift and airlift and finally the subquestions that we have been exploring to some degree between mixes and other issues. Let's try to make this pretty simple. Lead us through this. Two MRC's require what kind of lift in terms of tonnage?

General RUTHERFORD. On the airlift side, 49 to 52 million ton miles per day is the number that has been laid out in the Bottom-Up Review that we have been talking about.

Mr. HUNTER. You obviously look at the present inventory of ships and aircraft that we have got, look at that and say, can we do it? 52-million-ton-miles a day; our present inventory is how short or how excessive of that requirement?

General RUTHERFORD. The requirement again, 49 to 52, we are presently at 48.8.

Mr. HUNTER. Does that presume any casualties at all in terms of PREPO's?

General RUTHERFORD. I'm sorry, sir. I was talking about airlift.

Mr. HUNTER. That question is based on an earlier question that has to be answered as to how much you are going to have prepositioned; right? You had to do that first.

General RUTHERFORD. Yes, sir.

Mr. HUNTER. Does that number, the 52-million-ton-miles, is that derived initially from an analysis that assumes any casualties at all or attrition of your PREPO's? Does that assume all of your PREPO's remain totally undamaged and they deliver every single pound that they have got on them?

General RUTHERFORD. Sir, let me backup for a second.

Mr. HUNTER. OK.

General RUTHERFORD. In the sealift side of the house, we have stated that we need 10 million square feet of surge sealift capability.

Mr. HUNTER. OK.

General RUTHERFORD. In addition, we need 4 million square feet of afloat PREPO was the given. Then we will need some sustainment capability.

Mr. HUNTER. OK.

General RUTHERFORD. That sustainment capability has not been defined to me in terms of square feet, unfortunately. The way I think about it is, I need to move about 7,000 container units per week in a liner service. Then I need another 15 or 16 ammo ships.

Mr. HUNTER. OK.

General RUTHERFORD. So, that's the total sealift requirement. Your question is, does that include some attrition along the way?

Mr. HUNTER. Yes.

General RUTHERFORD. I don't know the answer to that.

Admiral QUAST. I don't believe it assumes any attrition. We have war gamed it. The way we fight it we would go in and it would be a sanitized situation by the time we arrive with our prepositioned. We will have the submarine threat going. We will have all other threats under control. Both the *Seawolves* will be right there. I have got to tell you that on the delivery side of the house, we assume that 10 million square feet is going to get there.

Mr. HUNTER. I guess what I am saying is, I want to ask you if you don't think you are building this thing on a series of dangerous assumptions? In response to the gentleman from California's question with respect to how you were adjusting this mix, the answer was you were relying more on the second adjustment on preposition.

It looks to me like a good way to move the paper and to try to save some dollars in terms of buying lift. I'm just saying that I think that relying, assuming that everything is delivered without enemy ordinance taking a single pound of supplies down is a little bit rosy; isn't it?

General HAWLEY. Yes, sir, there is a lot of it there.

Mr. HUNTER. You were involved in this suggested bottom-up review; right, General Rutherford?

General RUTHERFORD. The bottom-up review was being completed just about the time I walked into my job, sir.

Mr. HUNTER. Admiral Quast, how about you? Were you involved in this?

Admiral QUAST. The bottom-up review?

Mr. HUNTER. The adjustment.

Admiral QUAST. No, sir, I was not.

Mr. HUNTER. I have got a couple of other questions for the record I would like to ask. What were the results of the recently completed C–17 should-cost review? To what extent does the budget request for the C–17 in fiscal year 1996, and the funds requested in the strategic airlift line in fiscal year 1997 reflect any estimated savings resulting from this review?

General HAWLEY. The 1996 budget was submitted before the should-cost was completed. If you take the results of the should-cost and ask what do we think the airplane is going to cost if we complete a buy to 120 aircraft, the should cost would lead us to believe we should be able to buy the next 80 airplanes, 41 through 120 for an average cost of about $212 million in fiscal year 1995 dollars.

Mr. HUNTER. How much is in the fiscal year defense plan [FYDP] for strategic airlift in each of the years after fiscal year 1997?

General HAWLEY. It runs $2.6 billion to about $4.3 billion on an upward slope from 1998 through 2001.

Mr. HUNTER. Do you think this amount is going to adequately fund the C–17's and the NDAA?

General HAWLEY. Yes, sir. We are confident that the funding profile that we have laid in will allow us to execute the airlift force structure decision that is made in November.

Mr. HUNTER. What are your procurement rates?

General HAWLEY. The current funding stream is built on an assumed buy of 120 C–17's procured at a rate of 888121212 through the fighter.

Mr. HUNTER. Say that again a little slower, general, so we can get it.

General HAWLEY. The strategic airlift funding line was built on the assumption that we would buy 120 C–17's, since that's the only thing we could price. It assumed a procurement profile of 8 aircraft in 1996, 7 and 8; and 12 in 1999, 2000, and 2001.

Mr. HUNTER. Do you think a mixed fleet of C–17's and NDAA's can meet the 52 million ton miles requirement sooner than an all C–17 fleet?

General HAWLEY. That will be part of the question that we expect to be answered by this combination of studies which are ongoing. When we have the results, of all of those studies, then we will be able to provide, I think, a definitive answer to that question.

Mr. HUNTER. General Rutherford, your statement says a draft MRS Bottom-Up Review validated the requirement to reduce the size and readiness of the RRF in fiscal year 2001, but only after completion of the LMSR and remaining RRF acquisitions.

Why is there a requirement to reduce the size and readiness of the RRF?

General RUTHERFORD. We will have reached our dry cargo search capability of 10 million square feet, sir, in that timeframe. It is because the LMSR has come on board. As the LMSR comes on board we can afford to retire some of the ships.

Mr. HUNTER. OK. If we have any other questions, that members would like to ask, we are going to ask those now. When we get finished with those, we want to Mr. Skelton's office for a few minutes and get into some classified stuff, if we could.

Does the ranking member have questions?

Mr. DELLUMS. I don't have a question, but I would just make an observation for whatever it is worth. As we have gone through today's hearing, what jumps out at you is clearly there appears to be a mobility shortfall.

On the sealift side of it, they are saying that we cannot tolerate this shortfall. Looking at the very say shortfall, they are prepared to handle the shortfall for a much longer period time for the C–17 to come into the inventory and to retire the 141.

So, it is very interesting that in the same situation you have two relatively different responses to the shortfall. One saying, I can't tolerate this shortfall. I've got to go out there and close that gap quickly.

On the other hand, you have the other side of this saying you can tolerate this shortfall and we can handle it longer term. If that observation is correct, it would be interesting to ascertain why he thinks that is good? Why is there conflict there? It just seems to me just sitting back as a lay person listening that observation just jumps out at you.

Mr. HUNTER. That is a great observation. General Rutherford is the lift guy. You have two services here. One has one policy. One has another, as I think the ranking member has precisely stated.

What do you think about that? Do you think that the Air Force is being wiser and perhaps preserving their industrial base a little more than the naval services?

General RUTHERFORD. Sir, I think we are both trying to provide the lift our Nation needs out there. We have established our base

line now and looking at 40 to 52 million ton miles per days. We have 49 million ton miles per day. We have airlift capability today. That is our goal in 2006 also.

As we lose our C–141's, we still have C–17's coming on board right now to keep us at about 49 million ton miles per day. Actually, we dropped down to about 47, but that's a fairly small drop in my estimation.

Admiral HAWLEY. We are going to make a decision this November for the 1997 program. Whether that be NDAA, C–17's it will still give us the capability to replace those C–141's if they fall out.

On the sealift side of the house we thought last year we had sufficient money to buy those 36 RO/RO's, because it turned out we lost some of that money. We ended up with $43 million out of $158 million.

So we took that $43 million and got two additional ships which we still needed to operate which still left us five short. We made a plan to put the $70 million into those two additional ships in the defense budget which previously had been over in transportation.

We were able to take that $70 million and get into transportation. We actually wanted more than that. I actually asked for $160 million to go out and buy those ships immediately. That's about the best they could do in the last moments of the budget. They put $70 million in with a promise that they would cover the rest in 1997.

That is where we are today. I think both services are working very hard. We are constrained by a budget and what we can do in the time frame allotted.

Mr. HUNTER. Admiral Quast, do you have any comments on that?

Admiral QUAST. One is the industrial base. Looking at the industrial base, there is a sense that it is adequate to meet the needs of the Navy. As far as the immediate that you referred to, this comes out in the mobility requirements Study again. It read clearly. This is a clear road map. It is a balanced approach.

You say that we are going in one direction. We are really not. We are building new ships. We are converting others and we are trying to meet the surge requirement as fast as we can so that we can meet the defense——

Mr. HUNTER. What is your shortfall? In answering your question, General Rutherford, you said that the shortfall with respect to airlift is fairly small. But you implied at least that the short fall with respect to sealift is quite a bit bigger. What is the——

General RUTHERFORD. Sir, if I could put the shipping chart up right over here. It may be easier to see.

Mr. HUNTER. Go ahead.

General RUTHERFORD. I think that is an important answer here. In the second column over, I don't know if you can see the numbers. It is the second column over. It is the 1995 shortfall. The reason it came down from 1994 to 1995 is because we didn't get the RRF funding and had to move down to a lower readiness status. Some of that is RRF as indicated by the 71 dropping down to 26.

Mr. HUNTER. In terms of percentage, 10 million square feet, I presume is the requirement?

General RUTHERFORD. Yes, sir.

Mr. HUNTER. That's your requirement. In terms of percentage, it looks like you are about half way there, 5.1.

General RUTHERFORD. 5.1, yes, sir.

Mr. HUNTER. Can you explain the reason why DoD has a lift structure that is only a couple of points low, percentage points low in terms of airlift, but is massively low in sealift in terms of prioritizing dollars?

General RUTHERFORD. Yes, sir. I think it goes back to the cold war days when we looked at the problem of reinforcing Europe versus what we learned after Desert Shield and Desert Storm.

At the time of the cold war, we were looking for 66 million ton miles per day airlift. That was the requirement to move 10 divisions to Europe in a short period of time. We had a robust fleet there, if you will. We didn't have that in sealift. Sealift was very low because most of the equipment was prepositioned in Europe.

Mr. HUNTER. Let me ask you a followup question on that. It is in your interest now to increase sealift. That means you necessarily must be interested in increasing the shipbuilding capacity of yards. It is obvious with the Navy being the only game in town, the only way they are going to be able to build the capacity is to do a lot of domestic stuff.

Also, if they build some domestic stuff, you guys can use them in times of conflict is it in your interest to encourage some integrated domestic shipbuilding programs that won't cost the taxpayers a bundle to reinvigorate your yards and still have that industrial base, and perhaps put some reserve tonnage capability in your pocket?

Let me ask you something Mr. Vortmann. Right now nobody is making any money to speak of building big commercial ships in this country; Fight?

Mr. VORTMANN. Essentially, no one is really building commercial ships. A few people are about to embark upon it.

Mr. HUNTER. So the U.S. Government is not making any revenue off of shipbuilders in terms of taxes.

Mr. VORTMANN. That's correct.

Mr. HUNTER. In fact, they are probably paying out a tone of money to former shipbuilding employees who now must look to the government for resources.

Mr. VORTMANN. That's true.

Mr. HUNTER. I talked to the gentleman from California about this. What would you say bout a tax program in simplistic terms. If we are not getting any money from the shipbuilding industry now anyway in the government coiffeurs, if this Government could give the domestic shipbuilding industry a tax holiday for 10 years; we are not getting any money from you anyway.

If you want to build domestic ships for the United States, we are not going to tax you, but you will receive our blessings in terms of that in ship-lift capability and in the food that you are going to be putting on the table of thousands, tens of thousands of shipyard workers.

Is that something that you folks would welcome? Do you think that would be enough, a massive tax change to reinvigorate the industry.

Mr. VORTMANN. It would certainly be helpful. I am not certain without greater reflection of whether it would be sufficient, Mr. Chairman. The reason I say that is for us to produce a commercial ship that is going to compete internationally, we have to equate ourselves with the foreign government who is continuing and will continue to benefit from potential government subsidies. You not only have the benefit of 20 years' head start, since we stopped our support programs, but he was going to continue that out to 1999. I am not certain the tax differential would make it.

Mr. HUNTER. Even if we said you don't pay any income tax at all?

Mr. VORTMANN. I don't believe that will. I will have to think about it further. My gut tells me it would not be enough. I think there are other alternatives, cargo sharing concepts.

Mr. HUNTER. Remember, when you start doing a cargo preference thing, you start treading on agriculture's toes.

Mr. VORTMANN. No, no. I hate to interrupt. When I use that term immediately everybody reacts just as you did.

Mr. HUNTER. I like cargo preference, Mr. Vortmann. I like to use the word cargo reservation.

Mr. VORTMANN. Our approach would be that we would restrict it to imports and certainly not exports. We would not want to suggest anything that would hurt the American export capability. If we can diminish the imports coming in here and benefit from that by having a domestic industry built, I think there is a model that can be done.

Mr. HUNTER. The reasons I am looking at the battles ahead of you, you are still going to beset with some of the large American retailers who are going to say you are driving up the cost of these items that we want to put on K–Mart's shelves.

There will be a substantial interest fighting you just as there would be if you were exporting in the egg community. I think it is something we can do that the Republicans and the Democrats can agree upon that would benefit you folks without costing a lot of money.

That has always been the problem with trying to reinvigorate our industry. Could you take a look at that anyway about the idea of a tax deferral for an extended period of time, not just deferral, but paying no taxes whatsoever over a long period of time for American built ships.

Does the gentleman from California, or the gentleman from Missouri or Mississippi have any other questions? The gentleman from Maine, Mr. Longley.

Mr. LONGLEY. Thank you, Mr. Chairman.

I wanted to just pickup on one of Mr. Skelton's statements that I think we have got a long way to go before we get the clarity we need to deal with some of these fundamental issues. It seems to me, and I don't mean this just with respect to this panel, but it seems to me that there is a pattern.

I don't mean to be overly simplistic. If we are going to be making critical decisions about national defense and procurement issues, it seems to me that the equations are pretty elementary. We start with the threat. What type of force we need to deal with that

threat. What type of support force do we need to support the force? How big? What do we eliminate? What does it all add up to?

I frankly am beginning to fear that the lack of clarity is the result of an unwillingness to deal with some of the reality. We need to start dealing with that. A part of that is coming out in this hearing. For the life of me, I cannot envision the airlift requirements being met by going overseas for aircraft.

With all due respect to Admiral Quast, the statement that you made a few minutes ago that the Navy's industrial base is secure is absolutely beyond the knowledge that I have acquired. In fact, I was at a briefing with the Secretary 2 days ago where he predicted the dire consequences to Electric Boat, one shipyard of many, the dire consequences if *Seawolf* wasn't approved in the sense that 80 percent of that work force would be gone, never to be replaced.

I have visited four of the six shipyards in the American Shipbuilding Council. Every single shipyard is showing me the same table; 80 percent of those jobs are going to be gone. As I understand the total maritime industrial base of about 80,000 men and women are about to be eliminated in the next 2 or 3 years.

I have got to think that given how critical that aspect of our industrial base to the future of military security of this country, that we have got to be paying a heck of a lot more attention to it.

I have got a couple of other questions. Obviously I have got some feelings on this issue. As I understand it, Admiral, doesn't the Navy have the opportunity or the availability of charting ships on a short-term basis, if that is what it would take to provide a bridge to actually getting people employed again?

Admiral QUAST. Yes, sir, that's correct. In fact, I have got two RO/RO's under charter right now.

Mr. LONGLEY. Why aren't we looking at that as an option to the purchase of foreign shipping?

Admiral QUAST. The major concern was to assure ourselves that we had the sealift that was necessary in a time of crisis. If you put your assurance in the hands of other than U.S. citizens, you are gambling. There is a risk.

Mr. LONGLEY. Would they give us the boat without the crew?

Admiral QUAST. It is a risk.

Mr. HUNTER. We have got a short amount of time.

Mr. LONGLEY. Yes, sir. I don't mean to be abrupt. There must be some room for negotiation. Either hull that we could acquire that would meet the standards on a short-term basis until we can get the kind of shipping that we would like to see.

Admiral QUAST. We could charter them indefinitely if we would like to pay that kind of money for the assurance.

Mr. LONGLEY. Cost wise it cost much to buy them at $20 million than to charter them. Is there a study that has been done that quantifies the alternatives that are available?

Admiral. QUAST. I'm not familiar with one.

Mr. LONGLEY. Should there be one done?

Admiral. QUAST. Yes, sir.

Mr. HUNTER. Can I ask for the record that we ask that this information be submitted to this committee in terms of what the actual options are in terms of the plan that has been proposed in the

budget and a variety of options that might include full charter or partial charter which I would define as attempting to obtain the ship without having to require a foreign crew to operate it so the potential could also create opportunities for American mariners?

[The following information was received for the record.

There are basically three methods available to obtain ships for the Ready Reserve Force (RRF); purchase, lease, or build.

Purchase: The average acquisition and upgrade costs for the last 14 Roll on/Roll off (RO/RO) ships purchased for the RRF was $32 million per ship. With an expected life span of 25 years the straight-line amortized costs is about $1.28 million per year. The estimated annual operating and maintenance costs to maintain the ship in reduced operating status are $3.25 million per year. Therefore the total annual cost for an RRF RO/RO purchased from market sources is approximately $4.5 million per year.

Lease: There are very few US flag RO/RO ships; therefore it would probably be necessary to charter a foreign flag RO/RO and reflag it. The lease costly type of charter and the one that would maximize U.S. company and labor involvement would be a bareboat charter. The cost to bareboat charter a foreign flag RO/RO is approximately $3.65 million per year. Assuming a 25 year charter, the amortized costs to reflag would be approximately $120,000 per year and the annual operations and maintain costs would be about $3.25 million per year. The approximate cost of leasing a RO/RO and maintaining it in a reduced operating status is $7.02 million per year.

Build: Building a new vessel for the RRF is not a timely or cost effective alternative. Building a new RO/RO at half the cost of or new LMSRs would still be approximately $150 million dollars. The straight-line amortized capital cost over 40 years would be $3.75 million per year. The operating and maintenance cost would be $3.25 million per year. The approximate cost of a new built RRF vessel would be $7 million per year.

One variation to building vessels for the RRF is the concept of an active RRF. A commercial company would build a ship and the government would pay for installation of National Defense Features (NDF) to the ship that would enhance its military utility. NDFs would include, for example, strengthened decks and ramps for roll-on/roll-off cargo, and increased speed. If the problem of entry into a commercial market could be resolved this program could be viable for recapitalization of lower-readiness Ready Reserve Force ships at the end of the century. A program such as this, would be a deviation from the program recommended and the acquisition program must continue to proceed on schedule and the expansion of the inactive Ready Reserve Force to 36 roll-on/roll-off ships must be completed. It is vitally important to the Nation's strategic sealift capability that these ships be procured as called for by the Mobility Requirements Study; an active Ready Reserve Force program would not meet this requirement.

Mr. LONGLEY. At the same time, I am mindful of the testimony earlier this week where you mentioned the Admiral of the high Ready Reserve Fleet ships activated in the Persian Gulf Operation. Four of them experienced operation difficulties. Fortunately none of them were critical to their deployment.

The fact that four of our high readiness vessels experienced the difficulties they did tells me that we have got a problem. Along those lines, are there statistics available related to the sealift ship category which I understand they are expected to be available in 4 days?

Admiral QUAST. Yes, sir.

Mr. LONGLEY. Could we get a break down of the percentage of cargo carried by the seven FSS ships broken down in the initial 10, 20 and 35 days of Desert Shield?

Admiral QUAST. Yes, sir.

[The following information was received for the record:]

Six of the eight Fast Sealift Ships (FSS) met their 96 hour activation schedule. The seventh ship was in a repair status and activated in 7 days and 20 hours. The

eighth ship had just completed temporary repairs and was programmed for boiler work in a shipyard period. This ship was activated in 6 days and 12 hours.

A breakdown of the percentage of cargo carried by the FSS ships at days 10, 20, and 35 is as follows:

	10 Days	20 Days	35 Days
Total dry cargo (short tons)	281,130	400,799	596,884
Carried by FSS (short tons)	56,009	84,044	84,044
Percentage	19.92	20.97	14.08

Mr. LONGLEY. We can all make it available. We can evaluate the extent to which they were ready. Furthermore, the Ready Reserve Force Fleet ships which I understand were on activation schedules of 5, 10, and 20 days. I understand there are 96 ships in a fleet, the RRF.

Admiral QUAST. Eighty-nine ships.

Mr. LONGLEY. Of those 89, how many were activated in Desert Shield?

Admiral QUAST. First of all, I didn't know if the question was how many were in the RRF at the time of Desert Storm. I don't know the exact number. I would have to take that for the record. I'll get it for you.

[The following information was received for the record:]

There were 96 ships in the Ready Reserve Force during Desert Storm. Of these, 78 were activated.

Mr. LONGLEY. I would also like to know the activation schedule of each ship activated, how many met the schedule, and the percentage of cargo carried by these ships during the first 10, 20, and 35 days of Desert Shield.

[The following information was received for the record:]

The activation schedule of each Ready Reserve Force (RRF) ship activated during Desert Storm and how they met the schedule follows:

	Readiness period			
	5 Days	10 Days	20 Days	Total
Early or on time	11	5	2	18
5 days late or less	16	3	0	19
6–20 days late	19	2	0	21
More than 20 days late	9	4	0	13
Total	55	14	2	71

In addition to the 71 ships activated during Desert Storm; two ships were activated prior to and five ships were activated after Desert Storm.

The percentage of cargo carried by these RRF vessels during the first 10, 20, and 35 days of Desert Shield follows:

	10 Days	20 Days	35 days
Total dry cargo (short tons)	281,130	400,799	596,884
Carried by RRF (short tons)	2,417	74,361	190,385
Percentage	.86	18.55	31.90

Mr. LONGLEY. I guess I would just end on this note, Mr. Chairman. I am very distressed at the lack of clarity in the needs not only as it relates to our options and the specific options with respect to sealift, but also what I perceive as a lack of clarity with respect to precisely what our airlift needs are.

With all due respect to the panel, I appreciate the fact that there are a lot of complex analysis that are undergone. Somebody has got to take some responsibility and give us some specific numbers and some specific options so that we can at least evaluate them from our perspective in lieu of our attempting to try to do your jobs.

Mr. Chairman, that is all I have to say.

Mr. HUNTER. I thank the gentleman. Let me just ask one last question for the record here.

Mr. Kozlowski, I would like you to get back to us just a little memo that tells us how many thousand hours, employee hours per month your employees spend interacting with government personnel in the procurement process of the C–17, approximately, uniformed and nonuniformed.

[The following information was received for the record:]

This survey concluded that approximately 100,000 employee hours a month are required to accomplish these activities. We used the Commercial Practice initiative as described in the recent C–17 Program Should Cost Report and found it comparable to this level. We also used the recent Coopers & Lybrand study to benchmark our survey and found our estimate of hours to be consistent with their report. It does not account for the full DoD premium cost of the Coopers & Lybrand study but rather the obvious, "high drivers."

In recent years, the C–17 program was and continues to be the focus of considerable oversight. One might conclude that the 100,000 hours/month is a result of that special attention. It is not. The hours are driven by routine requirements. We are currently addressing each one for potential cost reduction.

Mr. HUNTER. Thank you gentlemen. Does the ranking member of the full committee or the ranking member of the committee have further questions?

Thank you very much. Let me ask just one last question. Can the building of the LMSR's be accelerated, Mr. Vortmann?

Mr. VORTMANN. We could build more ships in the same time period.

Mr. HUNTER. OK, close enough for government work.

Gentlemen, thank you for being with us. I am a little disturbed too about what I would consider the lack of clarity which is exactly what we have got. In the least, General Rutherford, we do know if you combine the sealift capability and the airlift capability, and the sealift takes what percent of our lift for the MRC's?

General RUTHERFORD. Ninety percent.

Mr. HUNTER. About 90 percent, and that is 50-percent short, it looks like we have got about 40 percent of the lift of the total tonnage that we need if you combine airlift and sealift. Is that fairly accurate?

General RUTHERFORD. Heavily dependent upon the commercial ships. Right below that number to make up that 5-million shortage, you would need 64 commercial ships, roughly to do our 10-million square to make up that surge capability.

Mr. HUNTER. OK. Thank you for being with us. Thank you for sticking with us. I want to thank the uniformed services and our members from industry. I want to thank all of you for being candid. Hopefully, the information we have gathered today is going to help us to make some decisions.

We have got a lot of big decisions, threshold decisions, and a lot of subsets to handle. We may be calling on you here in the near

future. Hope you can answer all of the questions for the record that we requested.

I want to ask the ranking member of the subcommittee, Mr. Skelton, are you available?

Mr. SKELTON. Yes.

Mr. HUNTER. Mr. Skelton is available to talk, General Rutherford with you, about some of the classified information after this hearing is over. You can give us a little better view of what is happening. I have got to run up to my office. I will try to come back to that meeting.

To all of the participants, thank you. This committee is adjourned.

[Whereupon, at 2:06 p.m., the hearing recessed.]

UNITED STATES AIR FORCE BOMBER REQUIREMENTS

HOUSE OF REPRESENTATIVES,
COMMITTEE ON NATIONAL SECURITY,
MILITARY PROCUREMENT SUBCOMMITTEE,
Washington, DC, Thursday, April 6, 1995.

The subcommittee met, pursuant to call, at 10:10 a.m., in room 2118, Rayburn House Office Building, Hon. Duncan Hunter (chairman of the subcommittee) presiding.

STATEMENT OF HON. DUNCAN HUNTER, A REPRESENTATIVE FROM CALIFORNIA, CHAIRMAN, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. HUNTER. The subcommittee will come to order.

I want to apologize to my colleagues and to the folks in attendance at the hearing for starting a little late. We had a medical accident outside, and part of the hallway was cordoned off for a little while, so we thought it would be more convenient for our attendees and those who wanted to come to the hearing, if we waited a few extra minutes to get started, and I hope things are taken care of with the person who was stricken.

The subcommittee meets this morning to receive testimony on the Department of Defense's plans and programs for heavy bombers. But before introducing our witnesses, I wish to make just a couple of observations.

Overall, the situation today as it relates to the U.S. Heavy Bomber Force is mixed. On the one hand, most national security professionals recognize the growing importance of bombers to our ability to project power in the post-cold war era, and we just heard former Secretary Harold Brown expand on that or expound on that idea this morning, and to achieve our national military objectives in peacetime and in war, and let me give you one example.

Secretary of Defense Perry's most recent annual report states, and I quote,

> Bombers could be the first major U.S. weapon systems on the scene in a rapidly developing crises, particularly in regions where the U.S. does not routinely maintain forces. Bombers are able to have an immediate impact on conflict by slowing the advance of enemy forces, suppressing enemy air defenses, and inflicting massive damage on an enemy's strategic infrastructure.

Clearly, bombers will play an increasingly important role in U.S. defense strategy in the years ahead. On the other hand, I see a decided mismatch between the Department's rhetoric as to the importance of bombers and the Department's actual plans and programs.

First, there is the question of force structure. The bottom-up review found a need for 100 bombers per major regional conflict, and recommended a total force structure of 184 heavy bombers, but

subsequent budget-cutting efforts, which were quite creative, have resulted in a dramatically scaled back force structure, such that today we are left with a total of only around 100 combat-ready bombers for the foreseeable future. And we understand the idea that these bombers will swing back and forth at opportune moments between two major regional conflicts.

Second, I have concerns about DOD's commitment to equipping the Bomber Force in a timely fashion with modern armaments, including precision-guided munitions or PGMs. The Joint Direct Attack Munition [JDAM] is the DOD's primary PGM weapon under development, but it won't be available until the turn of the century or later, and the Tri-Service Standoff Attack Missile [TSSAM] was just canceled by DOD.

The question therefore arises, are there operationally effective and affordable options for outfitting the Bomber Force with the precision or near precision munitions capability before JDAM arrives on the scene. If so, we would like to hear more about these proposals.

Third, I am concerned that DOD does not yet have an opinion on the need to sustain a modern, effective Bomber Force over time. DOD has not yet made up its mind on the value of procuring additional B–2 bombers beyond the 20 aircraft authorized to date.

We look forward to receiving the results of the congressionally mandated so-called bomber study, but we need answers now to questions such as: How could procurement of, say, 20 additional B–2's affect our ability to fight and win two Major Regional Conflict [MRC's] nearly simultaneously, and how much would such a force cost? Are there ways of streamlining the acquisition of the additional B–2's so as to make them more affordable, and what are the alternatives to the B–2 if we are committed to sustaining the Bomber Force well into the 21st century?

To answer these and other questions, we are privileged to have before us today two distinguished experts on the Bomber Force. They are Gen. Mike Loh, Commander of the Air Combat Command, and Lt. Gen. Richard Hawley, Principal Deputy Assistant Secretary of the Air Force for Acquisition.

Gentlemen, you have been to a couple of our panels here, and welcome again, and thanks for coming in to help us with this very important issue. We appreciate you.

But before turning to our witnesses, however, I would be honored to yield to the distinguished ranking member of the subcommittee, Mr. Skelton, and Mr. Skelton is a true expert on the Bomber Force, and I yield to the gentleman from Missouri for any comments he deems appropriate at this time.

STATEMENT OF HON. IKE SKELTON, A REPRESENTATIVE FROM MISSOURI, RANKING MINORITY MEMBER, MILITARY PROCUREMENT SUBCOMMITTEE

Mr. SKELTON. Thank you, Mr. Chairman.

I compliment you and thank you for this all-important hearing. What we learn today in the questions that will be answered today, hopefully, will set the stage for the future of our country regarding the bombers, and we are guided by the bottom-up review which testimony was early on, we needed 184 heavy bombers in the force

structure. Then we heard about a year later that we would have 100 bombers to execute the two major regional conflict strategy, and I was shocked when I heard that.

We all know that the bottom-up review, according to testimony from General Shalikashvili and others, which states that we must be prepared for two major regional conflicts as a good strategy for our country. And I endorse it as many, many people do, but to do that, you need the proper force structure, including heavy bombers.

So I will ask the 100 vis-a-vis the 184 question, and I will also ask, what about attrition rates? We all know that from looking at the experience of other airplanes, that there are, from time to time, problems with them.

Sometimes they go down without cause or reason, and I speak more recently of a couple of F–16 losses that we have had. In conflicts, you can expect some to be disabled or destroyed or you might have a commander that doesn't understand and leave them on the ground like Douglas MacArthur did and allow his B–17 fleet in the Philippines to be completely wiped out.

So you have to have some extras along the line, and I am concerned about the numbers. We know the value of bombers, the excellent work that the B–52's did in the Gulf war, not only in hitting the strategic targets, but in causing the morale problems of the Iraqi Army, the F–117's and other bombers. F–117's would be the stealth delivery systems, did such an excellent job.

I think this whole area is one that is in need of a thorough discussion and a determined decision. Of course, I feel very strongly about the future of the B–2. There is an ongoing study. The answers of that study should be forthcoming this month, I understand. We look forward to that.

This is a terribly important area, not just for the Air Force, but for our country, and I look forward to answers so that we can make good policy in this subcommittee and make good recommendations for the Congress concerning this all-important subject of our bomber fleet.

Thank you.

Mr. HUNTER. My thanks to the distinguished ranking member for his statement. And I might mention and thank the chairman of the full committee, Mr. Spence is here today, and I want to thank him. And I want to thank the distinguished ranking member of the full committee, Mr. Dellums, for attending this important hearing.

And thank you, sir. And I might also mention that Mr. Dicks, who is one of our defense experts on the Defense Appropriations Subcommittee, is here, too, and I think that symbolizes to some degree the new coordination, necessary coordination and cooperation between appropriations and the National Security Committee in this day of reduced dollars, and we want to thank him for attending.

Mr. DICKS. Thank you, Mr. Chairman, for inviting me.

Mr. HUNTER. Certainly.

General Loh, the floor is yours.

STATEMENT OF GEN. JOHN M. LOH, COMMANDER, AIR COMBAT COMMAND, U.S. AIR FORCE

General LOH. Thank you, Mr. Chairman.

I previously submitted a written statement that I would like to put in the record.

Mr. HUNTER. Without objection, all statements for the record will be accepted.

General LOH. And I would like to make a few opening comments, if you will allow me, Mr. Chairman.

Mr. HUNTER. Please, sir.

General LOH. Mr. Chairman and members of the committee, thank you for the opportunity to discuss our Nation's bomber force, the centerpiece of our global power projection strategy.

As the commander of Air Combat Command, I provide the vast majority of combat airpower to our unified war-fighting commanders with few in-place forces. They need immediate and overwhelming firepower from the United States when they face a major regional aggressor.

Our long-range bombers armed with conventional weapons meet that need efficiently and effectively. Our security environment has become far less predictable and we face unprecedented threats to our national interests. Though our forces overseas have drawn down dramatically, our need for global influence and presence appears to be growing.

In addition, the commissions facing our forces are radically different. We are now a much smaller and home-based force, without the forward deployed units and infrastructure we depended on so heavily in the past.

The proliferation of weapons of mass destruction, theater ballistic missiles, and deadly air defenses complicate our security equation, and when we decide to commit U.S. forces, you expect us to accomplish our objectives quickly and decisively with overwhelming advantage and few casualties.

This new environment presents a tremendous challenge for our home base force and demands that we place global presence and immediate global power projection at the core of our new national security strategy.

Such a strategy depends on long-range airpower, especially when we are called into action with little or no warning. Our Nation's bomber force, with its immediacy, global range, massive precision firepower, and stealth, gives us unmatched flexibility to respond to the full spectrum of national security challenges. No other weapon system can project American power as efficiently and effectively.

Yet, I believe our bomber force is undervalued by many observers due to outdated cold war perceptions. Our bombers are still our most flexible nuclear deterrent, but their value to our Nation goes far beyond this limited role. When rearmed with advanced conventional weapons, their inherent capabilities make them a powerful deterrent to conventional aggression and the ideal centerpiece of our power projection strategy.

In the critical early hours of a major regional conflict, our bombers can launch from the United States to blunt the advance of any aggressor and buy time to deploy a winning joint force. With the combination of stealth and advanced munitions, our bombers can

decimate advancing armored divisions, attack the enemy's command and control air defense systems, and neutralize the weapons of mass destruction that hold the deployment of our follow-on forces at risk.

During sustained operations, our bombers can deploy forward to accelerate the tempo of theater air operations, and the combination of stealth and multiple-precision weapons makes them tremendous force multipliers.

In the opening days of a conflict, the B–52 can launch standoff weapons against critically important, high-threat targets as it did during the early hours of the Persian Gulf war. Once we reduce the air defense threat, our B–52's can penetrate to attack ground forces and other large targets using low-cost, direct-attack munitions.

The B–1, when upgraded to deliver precise conventional weapons, will be our workhorse. It will be able to strike with standoff precision weapons or use its speed, electronic countermeasures and nap-of-the-earth flying to penetrate enemy defenses and attack a wide variety of critical targets.

In addition, the B–1, can integrate easily into composite strike packages with fighters and defense suppression aircraft to attack more heavily defended targets.

The successful B–1 operational readiness assessment proved that the B–1 can sustain combat operations if we give it adequate funding for logistics support. We should give all of our B–1 squadrons the support to bring them up to the readiness level established for a mature bomber, which was demonstrated in the assessment.

Most of all, we need to leverage our investment in the B–1 by funding the conventional upgrades and electronic countermeasures that will allow our B–1's to reach their full potential.

But the leading edge of our bomber force is the B–2. The B–2's revolutionary capability places the full spectrum of potential targets at risk, and its advanced stealth allows us to attack covertly if necessary. In the opening days of a major conflict, the B–2 can decimate advancing ground forces and penetrate enemy air defenses to attack weapons of mass destruction and other highly defended targets. By attacking sophisticated air defenses, the B–2 will also enhance the effectiveness of our other bombers and follow-on fighter attack forces.

Bombers also offer significant new options in cases short of all-out war. With stealth and precision weapons, our bombers can deter or preempt terrorists by holding their bases of operation at risk, and they may allow us to counter the threat of theater ballistic missiles at the lowest cost with their offensive capability to strike these missiles before they are ever launched.

This capability to attack virtually any target within 24 hours with stealth precision and minimal risk to American lives, and in the case of the B–2, putting only two people at risk constitutes a new and more economical form of continuous global presence. With this kind of unmatched capability, it is important that we have an adequate force. Our analysis, my analysis, confirms that we will need 100 operational bombers to provide an aggressive and powerful response to a single major regional aggression.

Should we find ourselves in a second nearly simultaneous conflict, we will have to swing a portion of our bomber force from the

first conflict to the second. Moreover, the nuclear posture review calls on us to maintain a nuclear force of 20 B–2's and at least 66 B–52's. To provide sufficient bombers for our nuclear mission and to meet our conventional requirements, we need about 180 bombers for combat and training alone. The bottom-up review agreed with that number.

With 180 bombers and the necessary conventional upgrades and advanced munitions, we can execute the swing strategy and maintain a credible nuclear deterrent reserve. Yet, we should keep in mind that this swing strategy is untried and could stretch our combat forces and strategic lift and logistics capability very thin. If we are unable to swing bombers in the two MRC scenario, we will not have enough bombers to deploy 100 to each MRC. Not only must we maintain the bombers we have; we must preserve our capacity to produce bombers for the long term.

We have invested heavily in stealth and manufacturing technologies that are unique to bombers. Our bomber industrial base is a true national asset and we must find a way to preserve it. To get the most from our investment in bombers, we must equip them with advanced precision weapons, like the joint direct attack munition, the sensor fused weapon and the wind corrected munitions dispenser.

To meet our long-term need for standoff capability, we must push development of the joint standoff weapon and find an affordable replacement for the tri-service standoff attack missile that has a very high priority in the Air Force.

Bombers are our most efficient and effective means of projecting American power and presence around the world. A smart combination of upgrades, advanced weapons, and new aircraft will make our Bomber Force a formidable deterrent to all types of aggression and the centerpiece of our power projection strategy.

In closing, I would like to thank the members of this committee for your longstanding support of our Nation's defense and request your continued support for air power adequate to meet our defense needs in an uncertain world.

Thank you, Mr. Chairman.

DEPARTMENT OF THE AIR FORCE

Presentation to the Subcommittee on Procurement

House National Security Committee

on

6 April 1995

SUBJECT: USAF Bomber Requirements

STATEMENT OF: Gen John M. Loh
Commander, Air Combat Command

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NATIONAL SECURITY COMMITTEE

21-267 96 – 39

Mr. Chairman and members of the Committee, thank you for the opportunity to discuss our nation's bomber force, the centerpiece of our offensive global power projection strategy.

Airpower has proven, many times over, its vital importance to this nation, perhaps never more vividly than during the Persian Gulf War. And even as we enjoy so-called "peaceful" years, the options offered by land-based airpower –our bombers in particular – have never been more useful to us, and the need to nurture a strong and capable Air Force never more compelling.

As the commander of Air Combat Command, it is my responsibility to organize, train, and equip the Air Force's U.S.-based combat air forces to meet any possible aggressor. I provide the vast majority of the combat airpower our unified commanders depend on in their theater operations. Our commanders recognize that, with few in-place forces, they will need immediate and massive firepower from the Continental United States should they face a major regional aggressor; in their war plans, they insist that our long-range, conventionally-armed bombers answer this call.

The security environment has become far less predictable, and we face unprecedented threats to our national interests. Though our forces overseas have shrunk dramatically, our need for global influence and presence appears to be growing.

We are now a much smaller, primarily home-based force, without the sizable forward-deployed units and support infrastructure that we relied on so heavily in the past. This new environment has altered our strategy for protecting our security interests, and demands that we place global presence and immediate global power projection at the core of our new national strategy.

Such a strategy depends on long-range airpower – especially when we are called into action with little or no warning. Our nation's bomber force, with its

combination of immediacy, global range, massive precision firepower, and stealth, gives us the operational flexibility to respond to the full spectrum of national security challenges – from nuclear deterrence and major regional conflict to global terrorism. No other weapon system can hold at risk all the targets this nation deems critical, nor project power as effectively and efficiently. Our bomber force is truly a national asset and a key instrument of U.S. power.

And yet, I think our bomber force is undervalued. Perhaps this is due to old perceptions of our bombers as Cold War relics suited only for delivery of nuclear bombs. Though our bombers are still the most flexible leg of our nuclear deterrent force, they long ago moved beyond such a limited role. When rearmed with advanced conventional weapons, their inherent capabilities make them a tremendous deterrent to conventional aggression as well, and the ideal centerpiece of our new power projection strategy.

Our bombers are always ready. At the opening of a short-notice, major regional conflict, our bombers – with a combination of standoff and direct attack munitions – can launch from the United States within the first few hours to blunt the armored advance of any aggressor and buy time to deploy a winning joint force. With stealth, our bombers can penetrate deadly air defenses to attack weapons of mass destruction that hold our deployment at risk. When upgraded with advanced conventional munitions, our bombers will be able to decimate the enemy's advancing divisions, paralyze his command and control system, and cripple his air defenses. To ensure the deployment of our follow-on forces, all of this must happen quickly; our bombers deliver this kind of immediate combat power – efficiently and effectively.

During sustained operations, our bombers can deploy forward to accelerate our operational tempo, and they integrate easily into theater air operations. Their combination of stealth, precision, and multiple weapons makes them valuable force multipliers, and they add enormous firepower to our composite strike packages.

Bombers also offer significant new options in cases short of all-out war. For example, with immediate global reach and precision conventional weapons, our bombers can deter or preempt terrorists by holding their bases of operation at risk. And during hostilities, the United States may be able to counter the threat of theater ballistic missiles -- most efficiently -- with an offensive capability to target them before they are ever launched.

Today, our bomber squadrons -- soon to include our B-2 squadrons -- routinely demonstrate this kind of visible power projection on their "global power" training missions. Our crews fly non-stop from the United States to strike targets on bombing ranges in Asia, Europe, and the Middle East, demonstrating their power projection capability to our friends and potential adversaries alike. For example, as Iraqi forces retreated from the Kuwaiti border last fall, Air Combat Command B-1s and B-52s flew to the Gulf and dropped 55,000 pounds of live ordnance on a bombing range in Kuwait -- a powerful demonstration that was not lost on Iraq.

These global power missions do several things: they demonstrate our global reach; they put a formidable, cost-effective American presence in regions in which we may no longer have permanent forces; they give our crews valuable training in the missions they would fly in the opening hours of a major conflict; and they desensitize our allies to the use of bombers as a long-range conventional weapon. Last year, our bombers completed five overseas deployments and flew 34 global power missions in support of 11 JCS and 8 other exercises. This year our exercise participation will be even greater.

We have three bombers in our nation's inventory, the B-52H, B-1B, and the B-2. Each of them, when properly upgraded to deliver advanced conventional weapons with precision, will make a significant contribution during crisis and conflict.

The B-52H delivers both nuclear and conventional weapons. In the opening days of a major conflict, the B-52H can launch standoff weapons against critically important, high threat targets as it did during the early hours of the Gulf War. Once we reduce the air defense threat, our B-52s can penetrate to attack ground forces and other large targets using low-cost, direct-attack munitions on a massive, economic scale.

The B-1, when upgraded to deliver accurate conventional munitions, will be the backbone and workhorse of our bomber force. In the first days of war, the B-1 will be able to strike with standoff precision weapons, or use its speed, electronic countermeasures, and nap-of-the-earth flying to penetrate medium-threat enemy defenses and attack a wide variety of critical targets. In addition, the B-1 – with its great speed and firepower – can integrate easily into composite strike packages with fighters and defense suppression aircraft to attack more heavily-defended targets.

The successful B-1 Operational Readiness Assessment (ORA) proved that the B-1 is as sustainable as any other mature aircraft given adequate funding for manpower and spare parts. The results of the six-month test speak for themselves – the test unit's 84 percent mission capable rate far exceeded ORA standards. We also generated savings in support costs by improving parts distribution and repair times.

The B-1 should receive the support that will give the entire B-1 fleet the mission capable rate established for a mature bomber – 75 percent. And most of all, we need to leverage our investment in the B-1 by funding the conventional upgrades and electronic countermeasures for all 95 B-1s that will allow the fleet to reach its full potential. I ask for your support for these improvements.

Our bombers' unique capabilities put them at the center of our national power projection strategy. At the leading edge of our bomber force is the B-2.

The B-2 is one of the few systems in our history that has the capacity to define a new strategy. Its revolutionary capability places the full spectrum of potential targets at risk, and the B-2's advanced stealth allows it to attack covertly, if necessary. In the opening days of a major conflict, it can penetrate enemy air defenses to attack the enemy's advancing divisions and most heavily-defended strategic targets, such as his weapons of mass destruction, with precise direct attack munitions. By attacking sophisticated air defenses, the B-2 also enhances the operational effectiveness of our other bombers and follow-on attack forces.

In addition, this capability to strike virtually any target within 24 hours – at minimal risk to American lives – constitutes a new, and more economical, form of continuous global presence.

Our B-2s at Whiteman Air Force Base are performing very well during their first year in the field. During our last Red Flag training exercise, B-2s delivered live 2,000 pound bombs – at night, from high altitude, and with expected accuracy.

But I am concerned that we may not have enough bombers to meet all of our operational demands. Our analysis tells us that we will need 100 deployable bombers in the initial days of a major conflict to provide an aggressive and powerful response to an enemy offensive. Should a second major conflict arise during the first MRC, we will have to swing a portion of our bomber force from the first conflict to the second.

Moreover, last September the Nuclear Posture Review defined our requirement to maintain a nuclear force of 20 B-2s and at least 66 B-52s. To provide sufficient bombers for our nuclear mission and to meet our conventional requirements, our analysis shows we need about 180 bombers. The Bottom-Up Review agreed with that number

With 180 bombers and the necessary conventional upgrades, we will be able to execute this swing strategy and maintain a viable nuclear deterrent reserve; yet, we should keep in mind that this strategy is untried, and could stretch our combat forces, strategic lift, and logistics capability very thin. If we are unable to swing bombers in the two MRC scenario, we will not have enough bombers to deploy 100 to each MRC. So it is important that we maintain sufficient numbers of bombers for the long term.

Not only must we maintain the bombers we have, we must preserve our capacity to produce bombers for the long term. We have invested heavily in technologies based on stealth and modern manufacturing techniques that are unique to bombers. Our bomber industrial base is a national asset – we must find a way to preserve it.

To get the most from our investment in bombers we must equip them with advanced precision weapons. The Joint Direct Attack Munition (JDAM) will give us strike capability in any weather; the Sensor Fused Weapon (SFW) will allow our bombers to destroy enemy armor more efficiently; and the Wind Corrected Munitions Dispenser (WCMD) will allow our bombers to employ accurate anti-armor weapons from medium and high altitudes above air defense artillery fire.

To meet our long-term need for standoff weapons capability, we must push development of the Joint Standoff Weapon (JSOW) and find an affordable replacement for the Tri-Service Standoff Attack Missile (TSSAM). JSOW will give us standoff capability against armored forces, and a TSSAM replacement will give us long-range standoff against hardened, fixed targets.

Bombers are our most efficient and effective means of projecting American power and presence anywhere on the globe. With a smart combination of aircraft upgrades, advanced weapons, and new aircraft, we can make our bomber force a formidable deterrent to all types of aggression and the centerpiece of our global power projection strategy.

In closing, I would like to thank the members of the committee for your long-standing support of our nation's defense, and request your continued, future support for airpower adequate to meet our defense needs in an uncertain world.

Thank you.

Mr. HUNTER. Thank you, General Loh, and I want to start off with the distinguished ranking member of the subcommittee.

Excuse me, we might let General Hawley make a statement before we do that.

General Hawley, we didn't mean to ignore you.

STATEMENT OF LT. GEN. RICHARD E. HAWLEY, PRINCIPAL DEPUTY ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION

General HAWLEY. Sir, you have already received my statement for the record, and I think we are ready to take questions.

Mr. HUNTER. That is one of the greatest opening statements I have ever heard.

General HAWLEY. I knew you would like that.

DEPARTMENT OF THE AIR FORCE

PRESENTATION TO THE

HOUSE NATIONAL SECURITY COMMITTEE

SUBCOMMITTEE ON MILITARY PROCUREMENT

UNITED STATES HOUSE OF REPRESENTATIVES

SUBJECT: Bombers

STATEMENT OF: LIEUTENANT GENERAL RICHARD E. HAWLEY
Principal Deputy Assistant Secretary of the Air Force
For Acquisition

APRIL 1995

NOT FOR PUBLICATION UNTIL RELEASED
BY THE COMMITTEE ON APPROPRIATIONS,
UNITED STATES HOUSE OF REPRESENTATIVES

Mr. Chairman and Members of the Committee:

Thank you for the opportunity to appear before you and discuss the bomber programs in the President's FY96 budget request.

The Air Force is committed to modifying the bomber force to meet these evolving security challenges. Starting with the Bomber Roadmap briefed to Congress in June 92, the Air Force has developed a comprehensive plan for fielding a bomber force sufficient to meet these challenges.

B-2 development and production programs are well underway. Program costs remain within the Congressionally-mandated cap of $28.968 billion base year 1981 dollars.

Six B-2s have been delivered and are now operating at Whiteman AFB. The final B-2 on the assembly line is about 75 percent complete and scheduled for delivery in 1998. In addition, starting in 1996, the five flight test aircraft will be refurbished and upgraded to the final "Block 30" B-2 configuration. The last of these five aircraft will be delivered by 2000, completing the full fleet of 20 B-2s.

As the B-2 fleet becomes fully mission capable, it will have a robust arsenal of weapons to employ, including general purpose bombs, cluster munitions, nuclear free-fall bombs, sea mines, and smart weapons. The 2000-pound general purpose bomb is already certified for use on the B-2, and these munitions are now positioned at Whiteman AFB. Starting in FY96, the Global Positioning System-aided munition (GAM) will provide an interim near-precision capability until the Joint Direct Attack Munition (JDAM) is delivered. JDAM test assets will be available in limited quantities in FY97 and production JDAM weapons will be available and certified on the B-2 in FY99. These advanced weapons, coupled with tactical munitions dispensers, will provide the B-2 fleet with formidable strike capability by the turn of the century. Future standoff weapons, if integrated on the B-2, would furthur enhance the aircraft's effectiveness.

An essential element of long-term readiness is depot support. We have developed a comprehensive depot strategy as part of our overall plan for fielding the B-2. On 7 February 95, the Department of Defense released its final report and announced its decision to use a mix of government and contractor support for B-2 airframe, software, and components. This decision considered near-term investment, life-cycle cost, performance risk, and requirements for government performance of mission-essential work, as well as existing capabilities within the government and industry.

By FY01, B-1s will comprise over half the total bomber fleet. As the security environment has changed from a monolithic nuclear threat to many potential conventional hotbeds, so too has the B-1 evolved from a primarily nuclear role to a fully conventional role. Consistent with the terms of START, we are reorienting the B-1 as a conventional-only bomber.

The B-1 Conventional Mission Upgrade Program (CMUP) will enhance the aircraft's lethality and survivability in parallel with ongoing improvements to the B-1's supportability. All 95 B-1s will receive the capability to deliver advanced weapons in a higher threat conventional environment, enabling the B-1 to penetrate area defenses alone or in concert with other strike aircraft.

B-1 weapon delivery modifications are on track, and are planned to match weapon inventories. In fact, by placing 27 B-1s in reconstitution reserve status until the turn of the century when levels of advanced weapons will be sufficient to arm the entire B-1 fleet, the Air Force will save significant B-1 operations and maintenance expenditures, offsetting some of the modernization cost. Weapon development efforts include JDAM integration, incorporating global positioning information into aircraft navigation and weapons systems, and improving communications capability. The B-1 will achieve limited operational capability for cluster munitions such as the Combined Effects Munition and GATOR mine

in FY96, and for the JDAM by FY01. The Wind-Corrected Munitions Dispenser, which will achieve limited operational capability in FY02, will provide accurate dispersal of anti-armor submunitions, greatly enhancing the B-1's ability to destroy fielded forces on tomorrow's battlefield. Although the Tri-Service Standoff Attack Missile (TSSAM) program was canceled for sound reasons, the Air Force still has a valid requirement for this type of precision standoff weapon to hold heavily defended, high value targets at risk. We are working the acquisition strategy and operational requirements for a follow-on program. When the Joint Standoff Air-To-Surface Missile (JSASM) is developed, the B-1 will add it to its arsenal.

In addition to weapons modifications, we are planning a phased upgrade of the B-1's defensive system to improve its survivability against advanced air defenses. Improvements in crucial countermeasures capabilities are planned to coincide with fielding advanced weapons around the turn of the century and to lay the foundation for further improvements to meet threats in the 2010 time frame.

As demonstrated graphically in Operation DESERT STORM, the B-52 is a key part of our long range power projection structure. B-52s will continue to have a dual nuclear and conventional role well into the next century. B-52s modified to carry AGM-142 (HAVE NAP) air-to-ground missiles are currently the only bombers with precision munitions capability. Combined with Conventional Air Launched Cruise Missile standoff weapon capability, the B-52 provides theater commanders with significant power projection capability today.

Future B-52 enhancements include an Integrated Conventional Stores Management System to communicate with advanced weapons, GPS, secure anti-jam radio, and conventional munitions modifications to support JDAM and Wind-Corrected Munitions Dispenser kits.

As the U.S. reduces forward-based force structure, the precision, lethality, flexibility, and range inherent in a mature bomber fleet provides our nation with a unique resource for our national defense. The ability to strike an adversary from afar, in advance of force build-up within a theater of war, establishes the bomber as a linchpin in our "two Major Regional Conflict" strategy, and provides an affordable means to project global presence. The Bomber Roadmap and associated Air Force programs for the B-1, B-2, and B-52 will balance capability and cost to provide the nation a robust bomber force for the next century.

Mr. HUNTER. With that, let me yield to the distinguished ranking member, Mr. Skeleton.

Mr. SKELTON. Thank you very much.

General Loh, I have about three or four questions. Actually, they are really aimed at one answer, so let me ask them and you can answer them together, if you would.

There is this study, this congressionally mandated Heavy Bomber Study. I ask you the status and how soon the results can be expected. And I also ask you to answer, at one time, there was a proposal by the Department of Defense for 176 B–2 bombers, and now we have 20. Can you compare the then request to the small number we have now and project on what, in your opinion, we should have also. Is the study taking into consideration the attrition rate?

I mentioned that in my opening statement, and in conducting the study, what assumptions is the Department of Defense making about follow-on and how they differ from the assumptions made in the bottom-up review to which we have referred earlier?

In other words, are you comparing the same road map for each of the two studies? I would appreciate your discussion.

That is really one question, General Loh.

General LOH. Yes, thank you, sir.

With regard to the bomber study that is currently under way, I believe that it is in the final stages of being completed and I believe it will be briefed to Mr. Kaminski, the Under Secretary for the—the Deputy Secretary for Research and Engineering next week, and I believe the Secretary's intent is to have that study available for you by the end of April when you return.

The numbers of B–2's, let me go through a little litany on that if you will allow me to. The number 176, I am not familiar with, that you mentioned. I am familiar with 132 B–2's. That was the cold war number when we faced the massive nuclear threat and they were required for nuclear missions.

Then, starting in about 1991 to 1992, we reduced that number to 75. That was a post-cold war number, and then we precipitously reduced the number from 75 down to 20, I believe, in 1992 or 1993. And I would just point out that it is important to recall how we got to 20 from 75. Twenty became the minimum number that could provide a basic operational capability that could be used in a major conflict. When you got below 20, you can only deal with single missions or single raids and they didn't constitute an operational capability for a major regional conflict.

So we got to 20, not because it was the right number; we got to 20 because it was the minimum number to provide an operational capability. And the study, the bomber study, I think, I don't know what it says, but it is supposed to look into this question of what is the right number of total bombers and the right combination of B–52's, B–1's and B–2's, and so we must wait for the study to see what it says.

I believe in the results of the bottom-up review, and my own—our own analysis that we have done that projects a need for about 180 bombers for combat and for training. And then as you point out, in addition to that, you need some for backup inventory because some will be in depot at any one time, particularly as they go through these upgrades the next 8 to 10 years.

Some will be available—will be required for test, and you ought to have some for attrition reserve status in addition to the 180 that you need for combat and training, and that is what our initial bomber study said back in 1992 and that—as I mentioned in my statement, that continues to be the number I believe is necessary to conduct all of the things—to provide the bombers for all of the needs that I must provide them for. So that is—I believe that essentially answers the set of questions that you asked, sir.

Mr. SKELTON. It does. Can you give us any preview on the bomber study and also can you tell us what you personally have had for this study and what it basically summarized?

General LOH. I do not have any insight into the results of the study. I believe it is on schedule. We provided in Air Combat Command and in the Air Force, through a large aggregation of data, inputs to the study.

We provided the scenarios that we thought fit, how we intend to employ bombers, the concept of operations for bombers, our logistics support concept for bombers. We provided the set of targets that bombers would be required to hit, and we provided our concept of deployment, and so forth, and how we would operate bombers. So we interacted at length with the members of the team that is conducting the study in the Pentagon to provide all of that input. But I do not have any insight into the results right now.

I would defer to General Hawley who may be closer to it.

Mr. SKELTON. Were your policy inputs—did you have policy inputs into the bomber study?

General LOH. I did not provide policy inputs. I believe the policy was that which was reflected in the bottom-up review and the defense planning guidance.

Mr. SKELTON. I think in this whole scheme of thing, we speak about bombers, we tend to forget the most basic attribute of the B–2 bomber, and that is the fact that it is literally radar invisible. I think that along the line and in open session it might be a good idea for you in 25 words or less, in an unclassified manner, again tell this committee how valuable this particular bomber is relating to the stealthiness of its design and capability vis-a-vis other bombers in this world.

General LOH. In 25 words or less, sir, stealth provides us with a fundamentally different and revolutionary capacity to use bombers than before. They can penetrate advanced defenses without detection through a combination of mission planning and its design for stealth and attack targets that previously we were unable to attack before we eroded those defenses and suppressed them significantly.

So it is a much more efficient way to go after those strategic level of targets and advancing armored targets than we can achieve with other bombers or other fighters, for example.

Mr. SKELTON. Thank you.

Mr. HUNTER. I thank the gentleman.

Mr. Everett is recognized.

Mr. EVERETT. Thank you, Mr. Chairman, and good morning.

General LOH. Good morning, sir.

Mr. EVERETT. General, I am concerned about our standoff attack weapon capability and the serious state that it is in since the can-

cellation of the TSSAM. And I was pleased to hear you say in your statement, quote: "To meet our long-term need for standoff weapons capability, we must push development of the Joint Standoff Weapon and find an affordable replacement for the TSSAM [TRI-Service Standoff Attack Missile]."

I believe you stated on other occasions that the HAVE NAP AGM–142 can address the standoff efficiency. However, we find ourselves in the current present budget with no funding for this program. Could you provide us with your thoughts on the HAVE NAP and how we need it, and if you had additional funds, would you procure more AGM–142's?

General LOH. Well, since the cancellation of TSSAM, we have a problem equipping our bombers with a standoff weapon. I prefer to address that problem in two stages, near term and longer term.

In the near term, we are seeking to buy a few more conventional air launch cruise missiles. We have a few now but we are seeking to buy a couple hundred more conversions from the air launch cruise missile to the conventional air launch cruise missile, and we have but a few of the weapons that you refer to called HAVE NAP, which is particularly effective because it has a minimum standoff capability, standoff range for the B–52. It provides man-in-the-loop guidance so that you can be very accurate with it, but we only have a few of those, and for the near term, it would be useful if we could afford to buy a few more of the HAVE NAP missiles, particularly for the B–52, a few hundred of those.

In the long term, we need to find a replacement for the canceled TSSAM Program, and we have put together a preliminary set of operational requirements. We have briefed the members of industry teams who would be involved in the design and fabrication and production of a follow-on to TSSAM, and we need support for that program for the longer term. That would not produce an operational weapon perhaps until the year 2000 or 2002 or so, and so I prefer to address that in kind of two stages, to shore up our need right now because the HAVE NAP system works. It is a very successful standoff weapon, and the conventional air launch cruise missile also works, so we know it works, we can depend on it. I would like to buy a few of those in the interim, and then put our emphasis on replacement for TSSAM.

Mr. EVERETT. Addressing short-term needs, you say a few hundred. Could you zero in on that a little closer?

General LOH. Well, I guess more is better. Given our funding constraints, we probably can only afford 200 or 300 conventional air launch cruise missiles and maybe 400 or so HAVE NAP's. That would be a number that we would find very useful. Given additional funding, we might seek more but we have other competing priorities at the present time.

Mr. EVERETT. Thank you.

Thank you, Mr. Chairman.

Mr. HUNTER. I thank the gentleman.

Gentleman from Texas, Mr. Geren.

Mr. GEREN. Thank you, Mr. Chairman.

I want to welcome both of our distinguished panelists, appreciate their being here and appreciate their fine service.

There seems to be—there are so many different reports on what the estimate costs are on the B–2 and, of course, you have got the procurement costs and you have got the life-cycle costs. I have seen that there are estimates that adding the additional 20 B–2's would be about $16 billion.

The Northrop-Grumman has offered to provide 20 additional B–2's for some $12 billion. Do you all have—could you help reconcile those two numbers, and perhaps if neither of those is accurate, what sort of numbers are you all using for your internal considerations?

General LOH. Well, I will give you some numbers, and I will ask General Hawley to confirm that these are the correct Air Force numbers. If you were to buy additional B–2's at the rate of, say, one-and-a-half aircraft per year, which is what we believe to be the minimum efficient rate that you would buy them, and we are talking about fiscal year 1995 dollars, this year's dollars, the total investment, not just the recurring flyaway, but the total investment for program acquisition, the total cost in the Air Force estimate is $19.6 billion.

If that production rate were to go to 3 aircraft per year instead of 1½, that number drops to $15.8 billion and that is the total investment costs for research, development, test, evaluation and procurement, and spare parts and all of the things that go with it. It is not just a recurring flyaway number. That is a number that includes full supportability of additional B–2's.

And I would ask General Hawley to adjust that number if he has a better number.

General HAWLEY. No, I think that is just right. The total cost for 20 more at 3 per year, we think, is about 15.8. You referenced different numbers provided by the Air Force and by the contractor. There are about 4 elements that constitute that difference between our 2 estimates, and, frankly, we are in agreement with the Northrop number as provided us, just that it didn't include all of the costs that we would have to budget for if we had to buy additional B–2 bombers, and those costs fall in the area of contingent liabilities, sustaining engineering, engineering change orders that are part of any program, and always occur, and then the essential performance warranty. I think the contractor agrees that these would be elements.

We are in discussion with the contractor at this time about the exact cost of those four basic items. But I think we are in basic agreement. The number that General Loh gave you is our current estimate.

Mr. GEREN. Thank you.

In discussions among some members of the committee and other Members of the Congress, a question that comes up is if we do go ahead with the 20 B–2's, who will the responsibility—or where will the responsibility for paying for it fall?

There are those who want to see it be a DOD-wide responsibility, others who say it will have to fall directly on the Air Force's TOA. If Congress directs the Air Force to purchase 20 more B–2's, what do you see the impact on the rest of the Air Force mission or—and what kind of conversations have you all had within the Pentagon

on recognizing this as a DOD-wide burden and not just something that is going to have to come totally out of the Air Force budget?

General LOH. Well, Mr. Geren, that is our dilemma.

Mr. GEREN. I beg your pardon?

General LOH. You have described our dilemma. If we sought more B–2's, 20 more B–2's, I think in the past, the Air Force has always said, sure, we would like to have more B–2's for all the reasons that we talk about. But if we are to buy 20 more B–2's, we are going to have to add significant additional budget to the Air Force or to the Defense budget, because, in my case, I don't want to buy additional B–2's at the expense of the B–1's, for example, because the B–1's provide a very significant capability to us. We have already completed our investment in them. We are seeking to upgrade them and they are very effective. We wouldn't want to buy additional B–2's or stretch out or reduce or cancel the F–22 program because we have talked about the need for bombers and the B–2.

I can also talk with great vigor about the need to achieve rapid air superiority over theaters of operations so that we can all do our missions, so the F–22 represents an enormously high priority program for the Air Force.

So I think the question comes down to the fact that if our strategy values bombers properly and if it indeed is a centerpiece of our global power projection and global presence capability and we recognize that, then somehow or other in the aggregate, not in the Air Force budget, but in the aggregate between the executive and legislative branches, we need to find a way to put it at a high enough priority to pay for it without goring anybody else's ox, so to speak. That is the dilemma we find ourselves in.

So it is a difficult question. Additional B–2's have enormous value. We have made a $24 billion investment in this magnificent set of technologies that is unique, that is truly a revolutionary capability, $24 billion just in research and development, and then to stop production at 20, is not maximizing your turn on return on that investment.

I read this morning the current issue of Business Week about the Ford Company. They invested $6 billion in their new, what do they call it, in the States it is called the Contour; $6 billion of investment. I don't believe their board of directors would want them to quit at 60 or 600 cars.

So this is a difficult question to come to grips with. But when you talk about it in terms of maximizing return on investment, maximizing your commitment that you have made and if you value the priority of this mission and the priority of the bombers properly, then perhaps there is a way to find out how to procure more.

But we have struggled with this in the Air Force and we cannot allow ourselves to reduce our budget to buy more B–2's solely within the Air Force, because we have equally competing or higher-priority competing priorities for our limited budget.

Mr. GEREN. I see my—excuse me.

Mr. HUNTER. Would the gentleman—his time is expired, but this is an important question, I think, to put to the General.

Would the gentleman yield for a minute, because I think it is an important instructional point for the committee, and I think we

need to get to it, because we are—otherwise, we are going to have—we are setting ourselves up for months of confusion in terms of cost.

Would the gentleman yield his time?

Mr. GEREN. I would be glad to yield.

Mr. HUNTER. Everybody has a handout here. It is a staff memo here.

Mr. HUNTER. If you could turn to the diagram that is there, this is kind of a complicated thing. We need to walk through this so that we all understand the handout sheet, so to speak. It is a diagram. It says: Air Force Estimated Cost of B–2 Ownership.

Could everybody take a look at that?

That is about one, two, three, four, five, six species of costs, and so when you are debating B–2 and you are trying to figure it out compared to other programs, you could look at any one of those and come up with a different number. And while we have our experts here, if everybody has turned to that, General Hawley, can you help—first, have you got those—have you got that handout?

General HAWLEY. I am not sure I have got all six of yours, sir. I have got four that I generally talk about.

Mr. HUNTER. Well now, you have got four that are criteria that show the difference between your estimate and Northrop's estimate, but I am talking about the various species of costs that we use to cost out a weapon system. Do you have it now?

The first is recurring flyaway, and that is the fabled well-known—that is the $560—or $570 million offer, unsolicited offer from Northrop; $570 million per plane, recurring flyaway.

Now, what does recurring flyaway mean?

General HAWLEY. Basically, recurring flyaway, if you went down to your automobile dealer and picked up a car and drove it away with a full tank of gas, that is recurring flyaway. That is what you pay on top of all your research and development investment to buy an airplane and fly it away from the factory.

Mr. HUNTER. OK, and the reason it doesn't have R&D, it is a lower figure than we have had in the past just because the R&D has been paid for by the first buy of aircraft, manifested in their prices; is that right?

General HAWLEY. In this case, that is right. The R&D is all written off. That is a sunk cost, and we are just talking about the added cost to go buy another airplane. In this case, 20 more airplanes, and that is the average cost of the 20 airplanes.

Mr. HUNTER. OK. So your first species of cost is the recurring flyaway. That is the offer from Northrop. That is the $570 million, and that is basically the airplane flying off the runway without support, without other types of costs.

Second type of cost is in aircraft, aircraft flyaway cost, and that is a little higher than the recurring flyaway.

What is that?

General HAWLEY. That is where you add in your nonrecurring cost. When you bed down a squadron, you have got a nonrecurring cost that you have got to bed down—pay to bed down that squadron.

Mr. HUNTER. What do you mean by "bed it down"?

General HAWLEY. You have got some—which is—you have got management overhead in there. You have got some construction you have got to do to support your basic fleet of airplanes.

Mr. HUNTER. You talking about the hangers?

General HAWLEY. Nonrecurring—hangars, those kind of items.

Mr. HUNTER. So you are talking about the garage for the Chevy that you have driven off?

General HAWLEY. Support equipment that goes in order to give you that flyaway package so you can actually——

Mr. HUNTER. Let me go over this again then. The flyaway cost would include things like the hangar, the—your loading equipment; right? Is that accurate?

General HAWLEY. OK, we have got—if I can go down the flyaway cost, tech data, hubs, kind of the airplane——

Mr. HUNTER. Your tech data is your manuals that tell you how to make it run; right?

General HAWLEY. And the manuals that you issue to all your pilots and weapon system officers, pilots that fly the airplanes so they can—all that kind of stuff. Support equipment so the ground support equipment that you use when you are preparing the airplane for flight, power carts, all that kind of thing that you need on the ground for the maintenance force to do its work. Training equipment; you have got some equipment you have got to buy to train your people, both maintenance and operators, and then you have got what we call other government costs and contractor services, which we buy and we only have to buy them once.

Mr. HUNTER. Let me try to make this—summarize this for the committee so the folks understand this. The recurring flyaway is for practical purposes, the naked aircraft. That is the aircraft with all—the systems are in the aircraft but it doesn't have the support equipment with it. The second type of cost is the aircraft flyaway cost, and that includes the basics that you need to make the plane run, your tech stuff, your training equipment, your hangars, if you will, your loading equipment if you will.

General HAWLEY. Mr. Chairman, I apologize. That is weapon system cost is what I outlined for you there. I think I leaped over——

Mr. HUNTER. OK, then let's go back.

General HAWLEY. I leaped over your flyaway costs.

Mr. HUNTER. General Hawley, we are going to walk through this thing so we understand. Let's go back then. Your recurring flyaway—is there anybody here who is real familiar with these costs?

General HAWLEY. Yes, sir, we have got it for you. I just read you the wrong list.

Mr. HUNTER. OK. Well, I want you to kind of understand, though, what you are telling me as well as just reading it to me. Recurring flyaway is basically the naked aircraft; is that right?

General HAWLEY. That is right. Materials and labor that it takes to build the airplane, and that is what we are paying for.

Mr. HUNTER. That is the $570 million.

And Mr. Peterson has a question.

Go ahead Mr. Peterson. We are on the first type of cost.

Mr. PETERSON. Does that mean that it is fully equipped with avionics, weapon systems, et cetera?

General HAWLEY. Yes, sir.

Mr. PETERSON. It is a turnkey job then, it is ready to go, it is CR, with the exception of crew and——

General HAWLEY. It is ready to fly.

Mr. HUNTER. You have got the basic piece of machinery when you have your recurring flyaway, OK?

Second, aircraft flyaway cost. Now, that includes what?

General HAWLEY. That is your recurring flyaway plus your nonrecurring labor, your management overhead that you pay for when you buy the airplanes. There is a certain amount of management overhead that we pay for that the contractors, of course, use to manage their program.

Ms. HARMAN. Mr. Chairman.

Mr. HUNTER. Go ahead, Ms. Harman.

Ms. HARMAN. I wonder if you would yield?

These numbers are, obviously, very high add-ons. I mean, just adding up here, my math is pathetic, but it is a more than 10 percent increase between the recurring flyaway and the aircraft flyaway, and since this will boil down to a matter of cost, as General Loh well knows, I would like to understand, when you say management overhead, exactly what you are take talking about?

Maybe you can't provide it this minute, but I think the committee is intensely interested in how you get to these high numbers and whether there might be a way we could cause them to be reduced.

General LOH. The difference—the management overhead consists of what it takes to—within the service and within the contractor to run that weapon systems. It is the cost of the System Program Office and Air Force Material Command. It is the cost of the contractor's overhead that is allocated to that particular program. And it includes some other overhead at the depot to be able to support the various parts of the aircraft that are being supported at depot that is allocated into that weapon system. So it is basically an overhead charge with the contractor, the System Program Office, and the depot that is required to operate and logistically support that weapon system.

Mr. HUNTER. OK, General Loh, let me go back and recap now so that the Members can hopefully understand this. In a simple way.

Mr. MCKEON. Mr. Chairman.

Mr. HUNTER. Mr. McKeon, let's walk through this before we have questions, because I think otherwise, we are going to complicate the system before he gets a basic understanding here.

Mr. MCKEON. I am kind of new to this program.

Mr. HUNTER. That is why we are going through this.

Mr. MCKEON. What I am wondering, it seems like there may even be a little misunderstanding. Could we get this in writing from them in the record?

What I would like—what I see happening out here in a few months from now is a debate on the Floor, and I see some of us saying a B–2 is $570 million, and I see some of us saying that it is twice that. I would like to have this on the record in writing from them.

I also would like to know, is this generally the way weapons are procured? When we buy a tank or when we buy a ship, do we add on all these costs? Where does this come along in the line?

Mr. HUNTER. For the gentleman, that request will be made right now to General Loh and General Hawley, and they have provided in the past a break-out. We need a detailed break-out of these one, two, three, four, five, six species of cost for the members of the committee. Can we get that from you?

General HAWLEY. Yes, sir.

[The following information was received for the record:]

B–2 ISSUES

The Air Force uses DoD Instruction 5000.2 to define each cost category used in their estimates. These definitions serve as the basis for all DoD weapon system cost descriptions and are not unique to the B–2 Program. The following costs pertain to the acquisition of 20 additional B–2 aircraft in constant FY95 dollars based on a production rate of three aircraft per year.

Aircraft Flyaway Cost ($14.2B)—All costs (recurring and nonrecurring) associated with production of the finished aircraft. The cost of obtaining a production capability is added to the cost of materials and labor. For additional B–2 Bombers, this includes the cost to re-establish a production capability.

Weapon System Cost (14.3B)—Adds the cost of additional aircrew trainers and the cost of the equipment to maintain the additional aircraft after delivery to the Air Force.

Procurement Cost ($15.1B)—Adds the cost of spare parts. The B–2 has two different requirements for spares: initial spares, which cover day-to-day operations, and mission readiness spares, which and parts bundled together and ready to go with the B–2 if it is deployed.

Program Acquisition Cost ($15.8B)—Adds the other appropriations needed to fuel the B–2, such as: additional hangers and expanded maintenance facilities in the United States and at forward operating locations. Also included is an investment in research, development, testing, and evaluation and Other Procurement.

Life Cycle Cost ($22.9B)—Adds all the operating cost the Air Force will incur from delivery of the first aircraft until the projected end on the fleet's service life (assumes 20 years). These costs include military and civilian pay and the cost to maintain the aircraft (including software) at Whiteman AFB, forward operating locations, and the depot.

Mr. HUNTER. OK, that is what we need. But for basic understanding before we go on, I want to go over this.

Now, General Loh, you got something to say here?

General LOH. Yes, sir; let me just run down quickly the differences. General Hawley talked about recurring flyaway. We just talked about——

Mr. HUNTER. Wait a second. I want to proceed the way I want to proceed here. I want you to—I have got a little problem now with confidence in whether you guys understand exactly what we are doing here. The naked aircraft is recurring flyaway, that is the machinery?

General LOH. Correct.

Mr. HUNTER. If you analogized this to a Chevy coming off the line, it is the car. The aircraft flyaway cost includes, if you analogize this to the Chevy coming off the line, the crew of General Motors people who, since this is a new car, would be dedicated to monitoring the progress, to doing the recurring—the new maintenance, the things that are going to have to occur basically from the factory crew; is that right?

General LOH. It is the dealer and his overhead required—allocated to that car. It is part of the—if I rent a home and I allocate

the garage where I am going to park the car, it would be part of the rent I pay every month in the house.

Mr. HUNTER. So it is military construction?

General LOH. It is allocating this overhead that is required to park the car and required to run the dealership and run part of the factory operation.

Mr. HUNTER. OK. That is your second species of cost.

Now, let me go to the third one. The weapon system cost; now, that includes what? For either one of you gentleman.

General LOH. I will answer.

Aircraft flyaway cost, plus technical data, all the publications required to operate, maintain and support it, support equipment, training equipment, simulators, maintenance simulators, air crew simulators, and there is a category called other government costs that we can break out for you in the written response. And we also procure contractor services to help us support that weapon system because, particularly early on, we need to constantly dialog with the contractor and have questions answered, and so forth.

So the weapon system cost is aircraft flyaway cost, plus technical data, publications, support equipment, training equipment, some other government costs that we will specify to you, and contractor services.

Mr. HUNTER. OK.

Now, let me, for members of the committee, let me just go over that. What we are talking about, and tell me if I am wrong, general, is your second type of cost, aircraft flyaway cost, basically includes the contractor team and equipment that effectively marries the plane to the crew and the pilot in terms of training, the simulators, the support that oversees their initial operations with this plane, make sure this Chevy works right, come back and check the systems. So it is a contractor team and equipment, and it includes some milcon. That is the hangar, for example; is that right?

General LOH. Which cost was that, sir?

Mr. HUNTER. That is the aircraft flyaway cost. We are still on No. 2.

General HAWLEY. No.

General LOH. No. Aircraft flyaway only includes the management overhead, the car dealer.

Mr. HUNTER. OK. Well now, general, let me just tell you, we are proceeding one at a time here.

Mr. PETERSON. Mr. Chairman, clearly, it includes the bed down and the milcon. That is, I think—does it not?

General HAWLEY. Not yet. We have got to get two more down the chart before we get——

Mr. PETERSON. See, your big money is between recurring and your flyaway, and it appears—between one and two.

General LOH. The difference between recurring flyaway and aircraft flyaway, at three a year that we were talking about the total of $15.8 billion, the difference between—for that number, the difference between recurring flyaway and aircraft flyaway is 67—is $1.4 billion. It goes from $12.8 to $14.2 billion.

Mr. HUNTER. OK. I thank the gentleman.

General Loh and I understand this is a little bit complicated. That is why we have got to go through this. Otherwise, we are

going to have what we are doing here on the House floor if we have a debate on this bomber.

Mr. McKeon. Mr. Chairman.

Mr. Hunter. Let me just walk the general through and then we will have some questions. I think we need to get straight here.

The first cost, the recurring flyaway, is the basic machine. The second cost is the machine and the government team and equipment that is necessary to marry up the crew and the pilot with this aircraft in an effective manner so that they can make it go; is that accurate?

General Loh. And the contractor team.

Mr. Hunter. That is what I said, the contractor team. It is the contractor team and equipment that is necessary to marry up the plane with its operators and make it work; is that right?

General Loh. Yes.

Mr. Hunter. Pretty good description. All right, that is No. 2. That is aircraft flyaway cost.

No. 3, weapon system cost. That is what? That is additionally what, besides what I have just described?

General Loh. That is aircraft flyaway cost, plus technical data, publications, all the support equipment, the training equipment, simulators, and so forth, maintenance trainers, some dollars and other Government costs which we will specify to you later.

In addition, the procurement of contractor services at our operating locations so that we can have constant dialog with the contractor, particularly in the early stages, to answer questions. And the difference between aircraft flyaway and weapon system, on an apples-and-apples basis at three aircraft a year goes from 14.2 to $14.3 billion, it is about $100 million for all of that.

Mr. Hunter. OK. We are halfway through.

Now, what is the U.S. Air Force procurement cost? Describe that.

General Loh. The procurement cost is the weapon system cost, plus initial spares and readiness spares, spare parts.

Mr. Hunter. OK. Give an example on a B–2 what that would be.

General Loh. That would be additional radars, additional tires, additional flight instruments.

Mr. Hunter. So if you are going to analogize this to the Chevy, that is the spare tire; right?

General Loh. Correct.

Mr. Hunter. Any other——

General Loh. The dealer has a whole raft of spare parts when you come—when it breaks, you come to fix it or when—if you take it in for a checkup and you replace the parts, that is all the spare parts associated with that. That takes the cost from $14.3 billion total for 20 aircraft at three a year, up to $15.1 billion total.

Mr. Hunter. OK. U.S. Air Force program acquisition cost. Now, what does that add on?

General Loh. That is the procurement cost, plus facilities, and——

Mr. Hunter. What will that include here?

General Loh. I will have to break all of that out for you.

Mr. Hunter. But, obviously, that is bases for—that is a lot of milcon for the support of the plane; is that right, General Hawley?

General HAWLEY. Right. That is your facilities that you have to build someplace to operate these additional airplanes.

General LOH. And there is some additional procurement that we will specify for you and that takes the number from $15.1 billion for three aircraft per year, up to $15.8 billion, which is the sum total of our investment for 20 additional aircraft at 3 a year in fiscal 1995 dollars.

Mr. HUNTER. Last, the U.S. Air Force life cycle cost. That is $22.9 billion/$31.5 billion.

General LOH. Those are not investment costs. Those are costs to operate, support, and maintain the system in the field, and includes the cost of military personnel.

Mr. HUNTER. For how many years, General?

General LOH. Well, I have got a figure for 20 years, 25 years and 30 years.

Mr. HUNTER. Now, I want everybody in the committee to understand that. This is a unique species of cost, and when you talk about buying a car, you say I am going to buy the Chevy for $12 grand. The Chevy, if you put in the cost of overhauling the engine at some point, the cost of repairs and maintenance, and does it also include the cost of fuel that will be expended in this aircraft?

General LOH. Yes, sir.

Mr. HUNTER. General Hawley nods.

The cost of any gas that you are putting in your car over the next 20 years, if it has got a 20-year life cycle, your $12,000 Chevy might really be a $30,000 or $50,000 Chevy, because it includes all of the repairs you are going to have to make for the lifetime of the Chevy, all the oil and gas that you are going to put in it.

Now, that is what we are estimating with this last U.S. Air Force life cycle cost. And that will average out to about how much per plane, General Loh?

General LOH. Boy, I don't have it——

Mr. HUNTER. General Hawley, do you have that?

General HAWLEY. I don't have the life cycle cost, but clearly it is about—

Mr. HUNTER. It looks like it is a little over $1 billion per aircraft. I have got $22.9 billion.

General HAWLEY. For the 20 airplanes, $22.9 billion.

General LOH. For 3 years.

Mr. HUNTER. So we are talking, ladies and gentlemen of the committee, that is the billion-dollar-plus figure. That is not just the cost of the plane, but the cost of operating that plane, fueling it, sparing it for the next 20 years, and that is in what year dollars, General?

General LOH. Fiscal year 1995 dollars.

Mr. HUNTER. That is in fiscal year 1995 dollars.

OK, now,——

General LOH. May I a make a comment here, Mr. Chairman?

Mr. HUNTER. Yes, sir, go ahead.

General LOH. Normally, when we project costs of systems, we don't include the operating and support when we compare the cost of one aircraft versus another. We compare it on investment cost, research, development, test evaluation and procurement.

We traditionally don't use life cycle costs to do that. We do it when we make decisions about cost of ownership, and so forth. That is the cost of ownership, the last category. The life cycle is the cost of owning that system for 20 years. It is a very important cost, but it is not the cost of buying the system.

Mr. HUNTER. General, I understand that. That is the precise reason why we brought this out, because that figure is being used to describe the B–2, the billion-dollar cost, and I wanted to make sure everybody understands, that is what that cost is. It is very unique. When you go down and buy a Chevy for $12,000, you don't buy it for $50,000 on the basis that that is what it will cost you to operate it for 20 years.

Now, we have walked through that. That is kind of important for the committee. I know we need to get onto other areas, but does anybody now—have any questions on this walkthrough we have done?

Mr. DELLUMS. Mr. Chairman.

Mr. HUNTER. The ranking member of the full committee is recognized.

Mr. DELLUMS. Thank you.

First, might I observe that I think this is a very interesting, useful and educative process that you just walked through. But because we are Representatives, because we have an awesome fiduciary responsibility for the voters and the taxpayers, there is only one number that is important to this group. It is the same question that I raised when we talked about the C–17. What is the number that the taxpayer is going to pay? Because that is the number you are going to have to deal with.

Now, we can dance through recurring flyaway. We can dance through aircraft flyaway. At the end of the day, you have got to make the decision about the amount of money that the taxpayer pays. So the question I would raise at this particular moment with our expert witnesses and you, Mr. Chairman, is, how much does the taxpayer pay? Because that is what you are going to act upon.

Before they answer the question, I might just allude to your own chart here, Mr. Chairman, when you come down to the bottom of life-cycle cost, you have two numbers. One number is $22.9 billion, which you essentially walked the witnesses to. But then in the right-hand column, you have a figure of $31.5 billion, which is the authorization and appropriation number. So it is to some extent misleading to suggest that lifecycle cost resides only at the $22 billion figure.

The number that we are going to have to act upon, it seems to me, if I am wrong, correct me, but why do you have the $31.5 billion if that is, indeed, not the authorizing and appropriation number? So I go back to my very simple, straightforward question. What is the dollar figure the taxpayer will have to pay for this airplane?

Mr. HUNTER. Mr. Dellums, let me just say to my friend, the reason we walked through this thing was so everybody would be singing off the same sheet of music, and we defined each one of these costs, and my point is——

Mr. DELLUMS. But we stopped short of answering my final question.

Mr. HUNTER. No, we didn't, and let me tell you why. The life cycle cost is not what the taxpayers pay for the system in this—in the procurement of the system—let me finish, if the gentleman will allow me to finish—it is what the taxpayers will pay for the next 20 years, including the fuel that the taxpayers will pay for a bombing run in the year 2010. In other words, U.S. Air Force life cycle cost includes all of the support for this system for the next 20 years. The moneys that you will spend in the future. Now, that is——

Mr. DELLUMS. Will the gentleman yield? Will the gentleman yield?

Mr. HUNTER. Let me just further say to the gentleman that the diagram that we provided from the U.S. Air Force for all the members does have $22.9 billion and it does have—that is in this year's dollars, 1995 dollars, and it does have $31.5 billion, which is then-year dollars, and the reason we put them on there was so the gentleman would have that information, and so General Loh could speak to that.

I asked him a direct question, now, is that this year's dollars or other years, and he said that is fiscal year 1995 dollars. So we haven't tried to mislead anybody. We have laid this thing out in painstaking motion because this is a very important point, and I will give the gentleman full right to expand on it.

Mr. DELLUMS. I am not suggesting misleading. I am suggesting that we have embarked upon a journey. Let's go to the end of the journey, and it seems to me the end of the journey is what is the reality, and that is, the amount of money the taxpayer ultimately will pay.

Now, if you are suggesting that we make a decision this year and we don't think about it 10 years from now, what was all this debate on the Floor of Congress for the last 100 days about the future?

Mr. HUNTER. Let me just answer my friend.

My friend, the reason we have laid these species of costs out is so when we have the debate on the floor and this committee, we can compare apples to apples and oranges to oranges.

Now, if we go—for example, if a member stands up and says a 747 costs $150 million, and you are spending over a billion dollars for a B–2, that is not an accurate comparison, because the 747 cost is what you actually cost or charge for the aircraft, whereas the bomber is what you are going to pay not only to buy the aircraft, but to run it for the next 20 years.

Now, if you used a similar analysis with respect to the 747, you might have—instead of 150 million bucks, you might have a $300 million figure. So my point is that all Members are going to use—everyone is good at using figures that they want.

I just wanted to lay these out because, first, I think there is confusion, and I think that is evidenced by some—I think there is even some confusion because it is so complex in the Services themselves. I know there is confusion among the members, and I wanted to lay that out so when we have a debate, we can have a good open, honest, candid debate on apples to apples and oranges to oranges.

I yield to my friend.

Mr. DELLUMS. I would like to ask our witnesses, General Loh, to answer the question that this gentleman has raised, and that is,

at the end of the day, what is the figure that the taxpayer will pay for 20 additional B–2 bombers if you—and then I would complicate the question by going to a point that you made. If you acquired them at the rate of one-and-a-half per year, if you acquired them at the rate of three per year, because even those are different figures.

Mr. HUNTER. General Loh.

General LOH. Let me give you two sets of numbers and explain them carefully. The first set I will give you is in fiscal year 1995 dollars. The total program, program acquisition cost at three per year is 15.8, and then on top of that, the 22.9 total cost is the cost of not only acquiring them, but then operating them for 20 years in 1995 dollars.

Those same two numbers, if we were to procure them at the rate of 1½ per year, those same two numbers in 1995 dollars are 19.6 for the program acquisition and a total of 25.7 for the acquisition plus 20 years of operation.

Now, we do have a set of numbers that are called then-year dollars. We have had to make estimates of inflation to get to those numbers, and in the case of 20-year life cycle cost, we have had to estimate inflation out for 20 years, which is a pretty risky business. So that is why we use this-year dollars, 1995 dollars, and we use then-year dollars for investment, because the investment may only occur—take 5, 6 or 7 years, but then when you start trying to estimate inflation out 20 years or 25 years, that becomes less predictable.

Mr. DELLUMS. Not a precise art, but you are trying to find a ballpark figure.

Mr. HUNTER. And will the gentleman yield on that point?

The point I am making, if we analogize this back to our Chevy, is that this—the life cycle cost, using this definition for a car that you buy from the dealer for $12,000, for a 20-year life cycle cost could well be $25,000 or $30,000, and as long as we carry the debate in that context, that this is a species of cost that extends to 20 years, then we are all singing off the same sheet and we can all have a straight up debate on it. And the reason I brought that out is because that is an unusual situation that most people don't comprehend when they look at these numbers.

Mr. DELLUMS. Would you answer the question?

General LOH. Would you like those answers, Mr. Dellums, in then-year dollars with someone's estimate of inflation? At the cost of three per year, the program acquisition cost is $19.7 billion in then-year dollars. That cost, plus the cost of operating them for 20 years, is $31.5 billion.

If we were to acquire them at the rate of one-and-a-half per year, the programming acquisition cost is $26.2 billion in estimated then-year dollars, and that cost, plus the cost of operating them for 20 years is $36.5 billion in estimating them in then-year dollars that go out well beyond 20 years, estimates of inflation.

Mr. MCKEON. Mr. Chairman.

Mr. HUNTER. Is the gentleman finished?

Do you have any other questions?

Mr. DELLUMS. I don't want to belabor this point, but I simply want to make sure that what you are saying, given their caveat,

given that there is some risk in estimating inflation, that the taxpayer at the end of the day, at the rate of three per year is going to pay $31.5 billion and at the rate of 1.5, $36.5 billion with a parenthetical comment that there is some risk in assessing inflation. But that, at the end of the day, is what the taxpayer is going to pay.

Mr. HUNTER. The gentleman is I think——

Mr. DELLUMS. If I am wrong, correct me, because I am not trying to walk anybody through any traps. I am simply trying to ask an intelligent question.

Mr. HUNTER. The gentleman, I think, from my perspective, has correctly stated it, if you define at the end of the day the year 2010, assuming that this bird comes off the line around the turn of the century. After 20 years, the taxpayer will have spent that amount of money on it in the same sense that after 20 years, having purchased a Chevy for $12,000, a car owner will have spent perhaps $25,000 or $30,000 operating and repairing that vehicle. In that context, if that is the end of the day, the end of the life, the useful life of the system, then the gentleman, I think, is right. I think we are then on the same sheet.

Mr. DELLUMS. That is how we think and that is how we plan and that is how we authorize, as I have understood it for 24 years.

Mr. HUNTER. At least it shows us our costs going in, and I agree with the gentleman in that respect.

Mr. DELLUMS. Thank you, sir.

Mr. HUNTER. Let me now, in this exciting subject, there is going to be a short test on these six species of costs, but let me turn to Mr. McKeon for any questions he might have on this little session.

Mr. MCKEON. This is very entertaining, Mr. Chairman. I come from a business background and I have had some familiarity with projections, projecting cost, projecting expenses, and when you get out 20 years, it is a total joke. There is no way—let's go back 20 years. We probably, 20 years ago, didn't expect to be flying B–52's at this point, or 30 years. What is the youngest B–52? Thirty-three years old?

General LOH. Approximately.

Mr. MCKEON. Let's project back 40 years, and who would have sat in a meeting like this projecting what the cost to the taxpayer of a B–52 would be out 40 years ahead. We can start throwing in some other equations in here.

What happens if we have a war and maybe we lose some of these planes? What projection are we going to put on that? Or what happens if we do not build the planes and we have a war and we lose even more?

What projections can we throw in on that? I think that we really need to focus in, and back to the question I asked earlier, is this the way we buy all weapons? Do we add the full lifetime cost for all weapons that we procure?

A machinegun, do we add how many bullets it is going to shoot in its lifetime and add the cost of those rounds?

I don't even see how you can possibly foresee some of these things that we are trying to add. I think the very important cost is things that we do know, what will the contractor sell us the plane for and that is the—one of the things I think we should real-

ly be focusing in on, and when we do that, it seems to me that in the recurring—or the flyaway cost and the recurring flyaway, sounded to me like we added another dealer cost in there going back to the airplane.

Usually when I go buy a Chevy, I give the dealer a check and then I don't pay him another cost. That—I have already paid him. Now, if I want to buy a service contract, that is a separate thing, and that seems to me like you pick that up in the weapon system cost or some other cost. That is why I am looking to see what these all would be when we have a chance to write them down and analyze them and think about them a little bit more.

Also, I wonder about the acquisition cost where we add in the cost of facilities. It seems like we will also be retiring some planes and they already are sitting in some facilities. Is that taken into account?

I think this is—just the start of this debate, and there is going to be a lot more we need to think about as we move forward on this.

Mr. HUNTER. I thank the gentleman for his question.

General, do you have any response here?

General LOH. Well, just one response. To answer the gentleman's question about are all systems costed this way; the answer is yes. These are DOD standard cost categories for any weapon system that the Department of Defense buys.

Mr. HUNTER. Sure, OK.

Thank you.

Mr. Chambliss is recognized.

Mr. GEREN. Mr. Chairman.

Mr. HUNTER. Excuse me.

Mr. Geren had a brief followup on this issue that he didn't quite get off in his round.

Mr. GEREN. I appreciate your letting me make this followup because I wanted to have a brief followup to just help us understand what your priorities are. And if we were unable to come up with all the additional funds that would be necessary to do this and the choice was 20 B–1's, and it means that you wouldn't be able to do the conventional mission upgrade—excuse me, 20 B–2's, and you couldn't do the conventional mission upgrade for the B–1's, what would your choice be?

The same for, if it means we are going to have to drop your fighter wings from 20 down to 16, what would your decision be? If it meant you were going to have to push the F–22 5 years further into the future or 10 years further into the future, what would your recommendation be?

General LOH. Well, as I said, none of those are choices that we would want to make instead of to procure 20 additional B–2's. In fact we, the Air Force, have testified previously that if we were given an additional, say, billion dollars a year, a question Mr. Skeleton asked me a few weeks ago in a hearing, we didn't include additional B–2's because we have some higher priority needs that we would want to take care of even before that. Like some additional F–16's or F–15's.

We are restoring the dollars taken out of the F–22 program, so we have higher priority needs that are already unfunded that

would come before we would seek B–2's. That is why this is a big question.

If the Nation is going to procure 20 additional B–2's, it needs to be kind of a national decision and not just an Air Force decision, because we don't have the budget to handle 20 additional B–2's.

Mr. GEREN. Thank you General.

General LOH. We have other priorities that are currently unfunded that we would fund before 20 additional B–2's.

Mr. GEREN. Thank you, General.

Thank you, Mr. Chairman.

Mr. HUNTER. Thank the gentleman for his question.

And I think Mr. Thornberry did have a brief question here.

We were going to—do you have a question here, Mac?

Mr. THORNBERRY. Sure. Thank you, Mr. Chairman.

I wanted to clarify one thing, as long as we are trying to clarify categories. We have a chart before us that shows the primary aircraft inventory, and that shows us considerably below the 184 bombers in the bottom-up review. In the bottom-up review, did that include the reserves or was that these primary aircraft inventory category?

General LOH. Well, let me give you the numbers that we have in our budget for fiscal year 1996 for the totals. The total primary aircraft inventory in fiscal 1996 for all bombers, B–52, B–1, and B–2 is 124, and that includes those available for combat and those that are available for training crews.

Mr. THORNBERRY. So it is considerably less than that, when you take the trainers off, those that are training. The ones we have got for combat are considerably less than 124.

General LOH. In fiscal 1996, the number is 100 that are available for combat.

Mr. THORNBERRY. So we are supposed to have 184, according to the bottom-up review, and we are barely over half of that?

General LOH. The bottom-up review included—you are correct. That is correct. You are correct.

Mr. THORNBERRY. When you project out how many more you all are intending to fund, we aren't even close to getting to the 184; are we?

General LOH. Well, our plans out through fiscal year 2000, we intend to bring back into the inventory some B–1's after they are upgraded, and we intend to buy the full complement of 20 B–2's, and so the number—the primary aircraft inventory number in the year 2000 is 154 available for combat and training, 130 available for combat and 24 that would still be required back in the States for training. So that number is——

Mr. THORNBERRY. I am just trying to understand. And so then what we have got to do is this swing strategy that you talked about, and if we get involved in one regional conflict, we have got to assume that we are going to be willing to take bombers out of that conflict and move them to another part of the world in order to meet our needs there for that second conflict and willing to pay the price, however, that may be calculated to do that; right?

General LOH. That is correct, sir.

Mr. THORNBERRY. OK. Thank you, Mr. Chairman.

Mr. HUNTER. Mr. Chambliss is recognized.

Mr. CHAMBLISS. Thank you, Mr. Chairman.

General Loh, let me just tell you, if you will house those that moved in with us for repair at Robins, we will try to minimize these figures for you, too. Is 20 years kind of a standard that you have always used from an accounting standpoint on trying to project these costs?

General LOH. Well——

Mr. CHAMBLISS. Let me carry that one step further.

General LOH. Yes, traditionally we have used 20 years, because back in the cold war, we felt we had to replace fighters, particularly at about 20 years because of flight considerations. These days we are—airplanes last longer, so we can use them. In the case of bombers, I think in the case of bombers, a better number is a 30-year number because once having made this investment, this large investment in B–2's, for example, we want to operate them, if there is no reason to buy a newer bomber because of the threat, we want to continue to operate them for a long, long time.

I mean, that just makes sense to keep that total life-cycle cost low. And so I don't believe a 20-year life cycle cost, lacking a significant upgrade in the threat, 20-year life-cycle cost doesn't make a whole lot of sense for a B–2 because we would intend to use that B–2 many, many, many years beyond 20.

Mr. CHAMBLISS. Same thing we have done with the B–52. I assume you probably use add 20-year life-cycle back then and they are projecting that in here. I believe you said the youngest one is, what, 33 years old?

General LOH. Yes, that is correct.

Mr. CHAMBLISS. So we have been flying them at least 30 years, which——

General LOH. That is taking it a little too far in the case of the B–52.

Mr. CHAMBLISS. Yes. But in any event, it is going to significantly reduce that life cycle cost if you look at 30 years as opposed to 20 years?

General LOH. It amortizes your total investment over a longer period of time and your annual cost goes down, yes, sir.

Mr. MCKEON. Will the gentleman yield?

I read it just the opposite. The longer you keep it, the more it costs. Maybe per year it drops, but the longer you keep it, the more it is going to cost.

General LOH. Sir, you are able to amortize that nonrecurring cost. You are able to amortize your investment over a longer period of time, so therefore the annual cost goes down.

Mr. MCKEON. Annual cost, but total cost goes up, OK?

Mr. CHAMBLISS. I don't see that in these numbers.

Mr. HUNTER. Let me try to——

Mr. MCKEON. But it has to because you are going to keep flying them. You are going to keep paying crews, you are going to have to keep putting gas in them. So the longer we run this out, the more something is going to cost.

Mr. CHAMBLISS. The more it is going to cost, but the annualized amount of the cost of the airplane is going to decrease over the life cycle of that airplane.

Mr. McKEON. Annualized, but the total cost is going to go up. We are looking right now at total costs.

Mr. HUNTER. My colleagues are both right. The total life-cycle cost is an aggregate figure, and if you get to the 20 years, you have got a certain aggregate figure, and if you put gas in the airplane the next day, you have got the aggregate figure plus a little more.

But on the other hand, all the costs that are figured on an annualized basis will go down if they are set and as time goes by.

Mr. McKEON. But if we are trying to build the cost of a weapon so that we may have less desire to buy that weapon, then if we can run it out 30 years or 40 years, we have driven the cost up. It makes it less attractive.

Mr. HUNTER. OK, it is Mr. Chambliss's time. Mr. Chambliss, proceed as you wish here.

Mr. CHAMBLISS. Let me carry that one step further.

We are talking about 20 planes here. If we were talking about 30 planes, again, is that bottom-line figure going to be somewhat less than what we are looking at on a per unit basis?

General LOH. The per unit program acquisition cost goes down if you buy more airplanes.

Mr. CHAMBLISS. Right.

General LOH. Because there is a learning curve and you benefit from building more of them. The last one is a lot cheaper than the first one. So if you were to buy more airplanes, the unit cost goes down, the cost per airplane goes down.

Mr. CHAMBLISS. And I believe you answered this with respect to, you don't take into account what happens if you have a major conflict, you lose an airplane. Obviously, we can't anticipate that, but what concerns me about it is, and when you look at these costs, all these dollar figures are fine, but what if you don't have this.

I mean, if we don't have the capacity that a B–2 brings to the table from a national security standpoint, from being able to protect other democracies around the world, where in the heck are we? What are we going to do if we don't have something with the capacity of a B–2?

General LOH. Well, my statement was and is that I believe we have a need for about 180 operational bombers in order to do all the things that we have to do with them.

Mr. HUNTER. Would the gentleman, Mr. Chambliss, yield for a minute?

We haven't been strict with our 5-minute rule, but this is an appropriate point to ask you this.

You talked about the swing scenario, where you possibly have two regional conflicts going. You swing your 100 bombers back and forth. Isn't it possible that in that required swing, because you only have 100 bombers to move back and forth, that if your timing is bad, that is, if you have a major offensive and in one of the MRC's, just as the bombers are leaving, that the sending of the bombers to the other conflict could result, could result in massive casualties in the one you just left, that it has—it is a risky—or it has a risk element to it?

General LOH. The strategy of swinging bombers from one conflict to another, if they are nearly simultaneous, and particularly if they are simultaneous, is risky. It is an untried, untested strategy. But

our analysis shows that if we were to have two major regional conflicts that occur, say, back to back, even after you are essentially finished in with the first one, you would have to swing at least half of those bombers to the second one.

So if the conflicts are in any way simultaneous, that risk just goes up because you still need those initial bombers in the first conflict in order to bring it to a successful conclusion. So the swing strategy adds risk.

I am not saying that we can't do it. I am not saying that it won't work, but it adds some risk, depending upon the simultaneity of the two conflicts.

Mr. HUNTER. And the risk to some degree is driven not by what we do, but by what our adversary does. For example, if you had an armored offensive that was taken immediately after bombers left theater, the one gentleman in this debate earlier referred to this in—as analogies to scheduling football games. You don't have—the divisions don't have their championships on the same day. But that is not within our control. The need for bombers often is driven by actions of the adversary, is it not, actions that they have taken, like mounting an armored offensive or doing something along that line?

General LOH. That is correct, sir.

Mr. HUNTER. So if you left a scenario, if you left a conflict with your bomber force, swung it to the other scenario and assuming that your adversary knew that, it probably wouldn't be wise for him to wait until you came back?

General LOH. Yes, sir; you are underscoring the point that bombers are valuable, both in the initial phases of the conflict before you have all of your forces deployed to the theater and also in the sustaining phases of a conflict, because they contribute tremendously with massive firepower during that phase, and that would be probably the phase that they would be swinging to another conflict under your description.

Mr. HUNTER. OK. Ms. Harman and then Mr. Bartlett.

Ms. HARMAN. Thank you, Mr. Chairman, again for letting me sit in on this subcommittee's hearings. I think they are excellent and this one is absolutely critical.

I am a supporter of the B–2, but in order for Congress to get to yes on this issue, I think we have to do some more work on cost, and I have said that before and I want to say it again. I don't think we need to work on the recurring flyaway cost, but we need to work on the rest of this, and let me just put this out.

We have just engaged in some procurement reform, both legislative and administrative, and the charts that Secretary Perry and I think Mr. Kaminski were showing us recently, show that procurement reform is bringing down the acquisition costs for the Defense Department.

My question is, Looking at these add-ons, is there a way, starting right now through procurement reform, reinventing overhead, call it anything, that we can squeeze down some of these other things? The aircraft flyaway cost, at least on these numbers, is a huge addition to the recurring flyaway cost.

The weapon system cost is modest—a modest addition, but some of these others are large. And what I am saying to both of you, and

I don't expect you to have an answer this second, is that there must be some squash factor here, I hope there is, there must be some way to simplify, reduce contractor-government overhead in some of these categories, or if there is not, perhaps this committee could try to find some ways to help you do that.

But my bottom line is, I can imagine this Congress, cost conscious as we are and fans as we are of other important defense assets, not permitting costs of this magnitude to be included in the Defense budget, and that would be a huge loss to our national security, let alone the economic security of a region of this country that I happen to represent.

Can you shed any light on this? Would you respond?

General LOH. Well, the cost numbers that we provided to you are the very best estimates by the best cost estimators within the Air Force who have a lot of experience doing this on a lot of weapon systems.

Hopefully, procurement reform in the future will be able to bring down the cost of weapon systems, and I am a very strong supporter of acquisition reform in the Department of Defense. But until we see some reality to acquisition reform, we must continue to use the cost-estimating techniques that have worked for us in the past. So there may be a possibility there, Ms. Harman, but we can't sign up to it right now.

I would make one other point. We in the Air Force and the Department of Defense are not known for bringing in weapon systems of this complexity under cost—significantly under cost. In some cases, it is the other way around, and so we are forced to use well-established cost-estimating techniques.

Right now, we are proud of what we can do today in estimating cost of weapon systems, but based on our experience and a lot of difficult experience in the past, these are the best numbers that we can come up with right now.

Ms. HARMAN. General Hawley.

General LOH. Did you want to add anything to that?

General HAWLEY. Only that our estimates are based upon a firm contractor proposal in this case, so until the contractor decides to change that, we are locked into that baseline, which was for 20 aircraft produced at three airplanes a year and he gave us the average recurring flyaway unit cost of $570 million an airplane.

Ms. HARMAN. Right.

General HAWLEY. Our estimators have adjusted that by the four factors that I mentioned earlier, none of which are amenable to a lot of reduction due to acquisition reform, although they are amenable to some change based upon negotiations with the contractor, particularly in the area of the performance warranty.

Ms. HARMAN. I see, but I just would note that the difference between $12.8 billion recurring flyaway cost and 15.8 billion, which is your fifth category here, program acquisition cost, putting aside the issues about life cycle, is almost a third, a third additional cost for operations, maintenance, personnel, et cetera, and whatever, and I—applying any kind of business maxim to this, and I think we do need to do that, and I know this Congress is trying to do that increasingly and I support that, it is a large addition.

I am not quibbling at all, that it is the way you have always done it, and that there is no leeway right now, given the way the Pentagon systems work. But I am trying to ask, maybe we could start with this airplane, which many of us would like to be authorized and appropriated, and try to change some of these systems.

I see my time is up, but I put it out there because I think that will be the key to getting Congress to approve this.

Thank you, Mr. Chairman.

General LOH. I would like to just make one comment, and that is we probably shouldn't use recurring flyaway. I can't fly airplanes just on recurring flyaway cost. The contractor likes to use recurring flyaway because it is the lowest number, but we have got to use program acquisition cost because that is what it is going to cost to operate the system.

So it is somewhat disingenuous for a contractor to run around and just use recurring flyaway cost. I can't operate and support a weapon system on recurring flyaway cost. So we talk about program acquisition cost. That is the real cost for us to buy and acquire the system.

Recurring flyaway and even aircraft flyaway costs are meaningless, but the contractor likes to use them because it lowers the number, and I believe it is somewhat disingenuous to run around talking just about flyaway cost. That is not the cost it is going to take to fuel the weapon system.

Mr. HUNTER. I thank the gentle lady.

Yield to the—we will consider this a continuation of Ms. Harman's question because this is an important issue and then we will be yielding to Mr. Bartlett.

The ranking member is recognized.

Mr. SKELTON. Let me ask this, because I think, General Hawley, you might be the one I should ask. Using the Air Force program acquisition cost of which General Loh speaks, what period of time does this cover? Does this—it must cover some period of time, because there is a differential of, roughly, 12.8 and 15.8.

General HAWLEY. Sir, that is the amount of money that you would spend over the time that you are actually procuring the airplane.

Mr. SKELTON. And what is that time?

General HAWLEY. In this case, it would be about 7 years under the contractor's proposal of three per year.

Mr. SKELTON. Thank you.

Mr. HUNTER. OK, and that includes, obviously, military construction, too, is that——

General HAWLEY. Yes, sir.

Mr. HUNTER. Is that right, the acquisition cost? OK.

We have the vice chairman of the subcommittee who has been waiting patiently, Mr. Bartlett.

Before you ask this question, I just have one follow-up to Ms. Harman's question.

You have established that this first cost is recurring flyaway that is the basis for the $570 million offer. That is basically the machine out the door, and at that point, you have got to train, you have got to marry up the—pay for this crew of contractor's team that marries the crew with the aircraft. You have got to maintain. You have

got to do milcon. You have got to do all the stuff that supports this system and makes it move over the target and unload ordnance, but would you—but it appears to me that the machine out the door, of course, is what the contractor does.

He puts a machine out the door, at least that is his primary duty. So for that purpose, I would say it is the building block, how much the Chevy costs when you buy it off the lot, and with respect to the accuracy of that number, Northrop said they could do this for 570.

If you figure out the Air Force number of 12.8, that comes to $604 million per plane. My question to you is, are you fairly confident in the 604 as an accurate representation of this out-the-door cost of the machine itself? Do you think the 604 is a good number that the Air Force has come up with?

General HAWLEY. My number is 642.

Mr. HUNTER. OK. I did some bad math then. You think your 642 is an accurate number?

General HAWLEY. Yes, sir.

Mr. HUNTER. Okay.

General LOH. That number on an apples-to-apples basis is our estimate of the contractor's $570 million number. We estimate that buying the same machine, and so forth, is 642 per copy.

Mr. HUNTER. Six hundred forty-two; and that is what year dollars?

General LOH. Fiscal 1995 dollars.

Mr. HUNTER. That is fiscal 1995 dollars.

General LOH. Bought at the rate of three per year.

Mr. HUNTER. And that is the 15.8 or——

General LOH. Yes, sir. That cost amounts to the total cost of 20 additional B–2's of 15.8.

Mr. HUNTER. OK. That is without inflation. That is 1995 dollars. Then we have defined that fairly well.

Anything else, General Hawley, I ought to ask?

General HAWLEY. No.

Mr. HUNTER. I now want to yield to the very tolerant vice chairman of the subcommittee, Mr. Bartlett.

Mr. BARTLETT. Thank you very much. I am sorry I had to be in and out.

My first question was to relate to acquisition cost, but I think that has been adequately covered, and I think that everyone on the committee is concerned with reducing those acquisition costs and so, hopefully, we will move in that direction.

My second question had to deal with the life cycle cost. We are going to need a certain number of airplanes, and whether they are B–2's or B–1's or whatever they are, there is going to be a cost for keeping them there and keeping them ready and using them, and so to that extent, we really need to make sure that when we are using numbers, that we are comparing apples to apples and oranges to oranges.

We also need to make sure that even in the costs further up that we are comparing like things, and I am concerned that when we really get down to comparing costs, that we are doing that, you have to help us to make sure we are doing that.

I have another question about life cycle cost. Because the B–2 is what it is with stealth characteristics, it can effectively drop munitions of very much lower cost as accurately or more accurately than other airplanes, and we need to figure into the total cost of our capability the ability of the B–2 to use gravity-type weapons that are man-guided instead of these standoff weapons that are less expensive.

Now, you can add up the cost of the standoff weapons, say, gee, that is cheaper than buying a B–2, but you use them once. You use the B–2 over and over again.

Have you looked at how you would look at the total cost of a B–2? Because the use of that aircraft through the future is going to have to reduce total operational costs since you can do the same thing with very much lower-cost munitions, how do you factor in, and you ought to be able to use that to subtract from the total cost of the B–2 so that we are, in fact, comparing apples with apples when we are looking at different bomber costs.

General LOH. Sir, you are absolutely right, and, hopefully, the bomber study that is coming out will shed some light on that question. The real parameter of interest is the cost per target killed, when you put in all the defenses and all of the capabilities of our systems, and the cost per target killed by a B–2 is—when you factor everything in is less than it is with other bombers, because it has much higher survivability features in it.

But those—but that kind of analysis is being done, as I understand it, by the bomber study, and that will be available by the end of the month.

Mr. BARTLETT. By the time we come to debate how we are going relative to acquiring future bombers, we will have this information and it can be factored in so that we are having a—I don't know what categorization you would want to use for describing what that is, but this—the kill cost might be—what you really want to do is to be effective, and because of what the B–2 is, it can be very much more effective. It will survive better, which is another cost, too. It will survive better because it is stealthy and it can now use very much lower-cost munitions.

So we need to have the real cost to the taxpayer as an effective necessary cost and how can we get that so that we are really comparing apples to apples in our final discussions.

General LOH. Well, I would hope that the bomber study that comes out would shed some light on that very question, and I would invite you to take a look at it in that regard, and if it doesn't, perhaps we can do some additional analysis in that area.

Mr. BARTLETT. Before we can intelligently make a decision which way we go, that is the number, don't you think that we ultimately have to have is the kill cost?

General LOH. Well, we refer to that as the cost-effectiveness analysis. The cost-effectiveness is what we are really after, the cost benefit of operating B–2's versus other alternative systems and not just other alternative Air Force systems, but alternative Army and Navy systems.

Mr. BARTLETT. But none of that is in this cost analysis?

General LOH. No, that is correct.

Mr. BARTLETT. So this will come down relative to other systems when you factor that in.

General LOH. I wouldn't want to make any predictions about that off the top of my head, sir, without seeing the analysis.

Mr. BARTLETT. Is it better or we shouldn't have built the B–2?

General LOH. The survivability is much higher, and as I said, the cost per target killed ought to be lower.

Mr. BARTLETT. Thank you very much.

Thank you, Mr. Chairman.

Mr. HUNTER. Thank the gentleman.

Mr. Longley.

Mr. LONGLEY. Thank you, Mr. Chairman.

I am reviewing the testimony, and I note in your opening statement you made the comment that commanders recognize that with few in-place forces, they will need immediate and massive firepower from the continental United States should they face a major regional aggressor. And I am looking at the numbers and I am assuming that you have got—the staff numbers, are they taken—derived out of your testimony?

General LOH. Yes, sir.

Mr. LONGLEY. I notice in fiscal year 2001, there is an increase of 22 B–1B's.

General LOH. In the case of the B–1, there is an increase of 12 from fiscal year 2000 to fiscal year 2001. That is—no, that is a good number. We intend to re—equip and fund for operations and maintenance additional B–1's.

For example, this year, we have a total of 60 B–1s for—that are funded for operations and maintenance, and that number by the year 2001 will go to 82, a growth of 22 in that category that we have in the Air Force plan.

Mr. LONGLEY. I just want to make sure these—I understand these numbers. Apparently, 12 of these 60 are training aircraft?

General LOH. That is correct.

Mr. LONGLEY. So the real number is currently 48?

General LOH. In fiscal 1996, if we were to go to war and use the B–1B, then I would send 48 to combat operations and retain 12 to continue to train crews. I could send those 12 aircraft, but they don't have trained crews against them, so I would be sending them with crews that are not trained for combat and don't have——

Mr. LONGLEY. With the B–52, and you are citing 74, in reality we have 62 that are—and I am going to use a term in a very specific sense—that would be mission capable, as opposed to a training aircraft?

General LOH. In fiscal 1996, that number is 44 for the B–52; 44 for combat operations and 12 for training, for a total funded for operations and maintenance of 56 for fiscal year 1996.

Mr. LONGLEY. So the reality is that we have got 44 B–52's in fiscal year 1996; 48 B–1B's for 1996; nine B–2's for a total of—is that 101?

General LOH. Well, it is. I believe the number on the B–2's should be 8 and not 9. So it is—the number is 100 and that is the number I testified to. It might be 101, but I believe the correct number is 100.

Mr. LONGLEY. And what was your testimony about the recommendations of the bottom-up review?

General LOH. bottom-up review said up to 184 bombers are required for the two MRC strategy.

Mr. LONGLEY. Are you—and again, I recognize that we are in a difficult position where we have got to match plans with reality. The bottom-up review recommended a minimum of 184. Is there any other study that suggested any number fewer than 184 or specifically suggested that we have 100 bombers?

General LOH. I am not aware of any.

General HAWLEY. You may be referring to the required for one regional contingency, one major regional contingency. The bottom-up review said you needed 100 deployable bombers to support that one contingency.

Mr. LONGLEY. The reason why I am asking this question, there has been significant debate in various subcommittees and this committee relative to whether we have the capability to fight two wars simultaneously consistent with the premises underlined in the bottom-up review, and we have seen a number of commanders come through here and tell us that we do have that capability, but what you are really telling us this morning is that we only have the capability to fight one MRC at a time.

General LOH. In order to deal with two MRC's that occur nearly simultaneously would require us to swing bombers from one to the other which adds risk to which I have testified.

Mr. LONGLEY. The reality is, though, that we could only allocate 50 bombers per MRC or the equivalent of 50 bombers per MRC. I am assuming from a planning standpoint, if half the time is allocated to another theater, that the time available per theater has been cut in half. Would that be correct?

General LOH. If we had a major regional conflict in 1996, I could send 100 bombers to that major regional conflict. I wouldn't have anything else available to put on the alert for nuclear reasons. I could still do some training, but then if a second nuclear—second regional conflict broke out, I would have to take some of those 100 and swing them to the second conflict.

Our analysis shows that we would have to send about half of those. We would want to send at least half of those to the second regional conflict, and so that is the situation we would face in 1996 if we had a—two major regional conflicts.

Mr. LONGLEY. And so is this number, frankly, a product of the budgets that you have either submitted or received from the Congress? Is there any individual—what I am trying to get at, general, is there any individual who has said that I am comfortable that we can face the threats that we may face as a country with a bomber force that is, roughly, 50 percent of what was recommended in the bottom-up review?

General LOH. I don't think anyone has said we are comfortable with it. We are facing the reality of a budget squeeze, and at the present time, we can't afford to operate and maintain more bombers, and that is what results in that number.

We do get better over the next 5 years. That 100 number goes up to 130. So we are trying to improve, but the reality of the situation is the budget squeeze has required us to reduce those bomber

numbers, it requires us to implement a swing strategy that adds some risk to our ability to conduct the bottom-up review scenario.

Mr. LONGLEY. Mr. Chairman, I ask unanimous consent to follow up with a question.

Mr. HUNTER. Sure.

Mr. LONGLEY. I want to jump out to fiscal year 2001, and we are showing a net increase of 22 B–1B's. Are those aircraft that currently exist or are these aircraft that would be constructed in a hypothetical future year?

General LOH. No, sir. Those aircraft currently exist and we are currently flying them. But the fact is this year in fiscal 1996, we have—we only received the funds for 60 B–1's, to operate and maintain 60 B–1's. The rest of them up to the total number of 1995, we still operate them——

Mr. LONGLEY. So the reality is we have those aircraft available currently; we just do not have the funds to operate them?

General LOH. That is correct. We don't have the funds to operate them. We don't have the crews to operate, aircrews or ground crews.

Mr. LONGLEY. Mr. Chairman, I just want to for the record state that in going back to the general's testimony, I as a member of this committee will eagerly await the bomber study. And I don't know again how the classified and unclassified portions of it will be organized, but I think a very significant question for this committee is given the strategy that has been outlined by the general, and I trust implicitly the expertise that he is presenting to this committee, I think a very serious question is the extent to which we have the force and the range payload capabilities that would allow us to execute the strategy that he has outlined. I would suggest that there might be some very sensitive issues that we may need to discuss in a future closed session.

Mr. HUNTER. I think the gentleman is on point and has made a good point. And I think we are going to need to follow up in that area.

We have got, I think, probably about 7 minutes left on this vote.

So we will adjourn briefly, come back in about 10 minutes or so.

Thank you.

[Recess.]

Mr. HUNTER. The hearing will resume.

Let me ask you, General Loh, how mature is the B–1B bomber? Because what we do with B–2 is, obviously, to some degree, a function of——

General LOH. Well, the B–1 is fully operational. And as you know, we had a very successful operational readiness assessment that showed that when we equipped the B–1 with its normal complement of spare parts and crews, that it can fly at availability rates and mission capable rates, we call them, that a mature bomber should fly at, which is above 75 percent. So the B–1 is doing very, very well.

Mr. HUNTER. Has the Air Force received Rockwell's proposal for their so-called virtual umbilical interim near-precision weapons capability? And what do you think about the proposal?

Do you think it is meritorious? How much is it going to cost for how many weapons and by when?

General LOH. Well, I haven't seen a formal proposal. What I have seen is a briefing, and I understand that Rockwell is conducting some flight tests of this concept that I would want to see the outcome of it and then get a proposal in before making any commitments to it. But that sort of thing is another way to get an earlier capability for precision weapons delivery, until we get delivery of the joint direct attack munition [JDAM] system, which won't be coming in significant quantities until the year 2000 and beyond.

It is more or less analogous to what we have done with the B–2, to provide it with a precision capability that will be available in late 1996 called GPS aided targeting system ground attack munition [GATS GAM], that you have—for which you have funded about 128 weapons, and that will give it a modest precision—the B–2 a modest precision weapons capability in about a little over a year from now.

The Rockwell proposal is I think somewhat in that same line, and I would want to take a look at it after they conduct a few demonstrations of it.

General Hawley, comments?

General HAWLEY. No, sir, I think you summarized it pretty well. It is in test. We have loaned an airplane, basically made an airplane available for testing of that concept and that testing is ongoing as we speak.

Mr. HUNTER. Just one last question and then I will go to Mr. Dellums and Mr. Dicks.

If all the bombers are involved in a major regional conflict, how will the bomber force be able to ensure nuclear deterrence, and should any bombers sit out an MRC in order to sustain nuclear deterrence? Why or why not?

General LOH. Well, we have discussed this with Admiral Childs, the Commander in Chief of U.S. Strategic Command who is responsible for our nuclear capability. And we have come to the conclusion that, for example, in 1996, if we had a major regional conflict, we would send all of our available B–52's and B–2's and B–1's to that conflict. And then if we needed to put some of those aircraft on nuclear alert, they would have to be recalled from that conflict to be put on nuclear alert back here in the United States, and so, therefore, they would have to be taken out of that conflict in order to do that.

Mr. HUNTER. OK.

So what you are really talking about is three potential calls on the B–2 force in a major regional conflict. No. 1, you could have a second conflict break out where you would have to embark on a swing strategy. You, obviously, have the requirement in the immediate conflict. And then besides those two, you might have to call some of that same bomber inventory back for nuclear deterrent; is that accurate?

General LOH. That is correct.

Mr. HUNTER. OK. The distinguished ranking member of the full committee is recognized for any questions he might have.

Mr. DELLUMS. Yes. Thank you very much.

First, let me say, I look forward to the bomber study. I think that that becomes an important and significant part of this discussion and this debate, and my hope would be that people would not move

to a premature judgment until such time as we have had an opportunity to substantively and objectively take a look at that bomber study.

Second, I appreciated this exercise of going through the cost. And I think General Loh's comment is very appropriate, that all these other flyaway costs are really at one level, meaningless to them.

I would just summarize by saying I believe that we are about to make a decision, and if it includes a decision—if that decision embraces 20 B–2's in terms of acquisition, inflation cost, that is about a $20 billion decision. That is about as simple as you can state it. Because inflation is a reality, and over time, that is going to be factored in. It is about a $20 billion decision.

Over the lifetime, it ultimately is about a $30 billion decision when you factor in life cycle cost, and some people want to talk away life cycle cost. I find that fascinating and interesting. Because the very same people who have been talking about reducing the deficit and balancing the budget and not mortgaging the future of people, can't sidestep the fact that when you make the decision this year, it has long-term implications, has dollar implications. And in terms of our responsibility in carrying out our duties in that respect, we have to think about that. And I understand the general's caveat that it is to some extent risky in assessing inflation, but you try to find some ballpark figure.

With those comments, general, I would like to get away from cost now and go back to some more substantive thoughts.

First, and I prepared a few questions that I want to raise, and my first question is sort of a three-part question. How did the Department of Defense determine that 100 bombers are needed for one MRC?

We have heard that several times here today, but how was that figure arrived at? What were the determining factors that—where you say we need 100 bombers for one MRC?

What key assumptions were used in analyzing heavy bomber requirements? Were bombers included in the campaign modeling conducted by the JCS during the bottom-up review?

General LOH. May I answer now, sir?

Mr. DELLUMS. Yes, sir.

General LOH. With regard to the 100 bombers to each MRC, that number comes about basically with our experience in the Gulf war. When you send 100 bombers that you operate in a peacetime mode and you send them over to a wartime mode, you get about 70—65 to 70 bombers' worth of capability because you fly them at a higher rate. So you take the spares for about 35 or 35 of them and you take the crews and you fly them with accelerated crews and accelerated flying rates and so you use up spare parts faster.

So when you operate and maintain 100 in peacetime, that is the equivalent of about 65 to 70 that would be operated with a higher operational tempo in a major regional conflict, and that is the number that we had in the Gulf war. That seems to be a good number with regard to how far away they have to fly from their bases to the targets and attack the number of targets that we need to attack in a major regional conflict. So that is the background on that number. I believe it is a good number.

I am not privy to any Joint Chiefs of Staff [JCS] studies that were done during the bottom-up review that validated what the Bomber Force structure should look like. Perhaps General Hawley is. We have done our own analysis at Air Combat Command because we have to provide the forces for all of these regional conflicts and I was concerned about what some of the limitations might be with regard to force structure. So we have done our own internal analysis that, again, validated that the number 180, 184 operational bombers is about right.

So I believe that the number that the bottom-up review came up with of 184, I don't know what analysis was used for that, but I have corroborated and validated that number with our own analysis at Air Combat Command.

Mr. DELLUMS. How does the Air Force's planned Bomber Force compare with the bottom-up review bomber requirement? Are they the same? If there are differences, can you explain the differences?

General LOH. Well, if you use the number 184 from the bottom-up review, we grow to 130 operational bombers by the year 2000 or 2001, and then we have an additional 24 that are funded for training for a total of 154.

Now, the bottom-up review number of 184, I am not sure whether that included trainers or not, but let's say that it did. The difference there is about 30. If it didn't, then the difference is 54. So—but I believe we need about 180 or so operational for combat consideration.

So that is how we—that is the actual number that is in our budget in the out years versus what the bottom-up review or what we are saying.

Mr. DELLUMS. Do you have any idea at this point how the 184 became part of the lexicon? How was that figure arrived at?

General LOH. I am not aware of how that was derived in the bottom-up review. Perhaps General Hawley knows, but I do not know the background on that number.

General HAWLEY. Sir, I am sorry I can't help with that. I wasn't involved in that process, don't have those details with us.

Mr. DELLUMS. Now I turn your attention to Commander in Chief [CINC] requirements.

General LOH. May I make one other comment though? The bottom-up review not only said 184, it said 100 to a single major regional conflict. And then the strategy says you have to have the force structure for 2 major regional conflicts, which meant that if—on that basis, you would need 200, but we can't afford 200 and so we get into the swing strategy where we swing them from 1 conflict to another in order to get around that point.

So I don't know the background on the 184, but I have given you that on the 100, and I think the 100 to be a valid number for a single major regional conflict.

Mr. DELLUMS. What did the CINC's study conclude about how many and what types of bombers would be needed to respond to 2 nearly simultaneous MRCs, and did the CINC's study validate the bottom-up review's conclusion about 100 bombers in one MRC?

General LOH. I am not familiar with a CINC study. We understand what the requirements are from each of the individual commanders in chief, and each of them support having a large number

of bombers because each of them need bombers in their theater of operation, particularly in the Pacific and in Europe and in Central Command.

Mr. DELLUMS. What I have specific—what I am alluding to is that in 1994, February, two fighting commands began a study to examine options for responding to two nearly simultaneous conflicts with the bottom-up review force based on a scenario that differs from the defense planning guidance scenario, and then it goes on to explain, and I am just trying to understand from you as to whether or not there was any conflict in what they arrived at in the bottom-up review?

General LOH. Sir, I am not familiar with what those studies showed.

Mr. DELLUMS. OK. With respect to the B–2, it is very interesting. As I understand it, on the one hand, you have created some incentives for Northrop to accelerate its production rate, and from the data that I have, it says that they have—they could profit by about $60 million if they speed up the production line. Is that—General Hawley, are you aware of any of this?

General HAWLEY. Sir, we haven't made any negotiations on an additional 20 aircraft and the rates at which they would——

Mr. DELLUMS. No, I am not talking about additional aircraft.

General HAWLEY. Talking about the current production?

Mr. DELLUMS. Current production. As I understand it, and if I am wrong, correct me, there has been an effort to create some incentives for them to speed up the production line, and there are some monetary incentives in that regard, but I am not focusing on that. I am just saying, is that correct, that there is an effort to speed up the production rate?

General HAWLEY. There are incentives in the current contract for meeting the schedule and exceeding the schedule and so on, yes, sir. I don't have the number with me, but I can get that for you.

Mr. DELLUMS. What I am trying to come to is what appears to be a divergent strategy all coming together. Because on the one hand, there is an incentive to speed—for Northrop to speed up, essentially go out of business, that is to speed up their present production of B–2's. But then as a result of the conference report last year, there is an effort made to maintain the integrity of the B–2 industrial base pending the outcome of the study, so that if indeed the bomber study concluded that a B–2 was a legitimate option, that the industrial base would continue to be maintained; is that correct?

So I think they have let some contracts to keep the industrial base, on the one hand, and then on the other hand, giving Northrop incentives to speed up the production line. So on the one hand, you are asking them to go fast, and on the other hand, we are asking them to go slow, and I am simply trying to understand the divergency of those two strategies.

General HAWLEY. The money that was authorized to support the industrial base of course has gone to protect primarily suppliers who were on their way of going out of business, and it doesn't make much difference how fast you finish assembling the airplanes that are on the line. The reason we tend to incentivize contractors if they meet or exceed the schedule is, of course, we save a lot of

money if they can shut down a production line earlier because we can get out of carrying all the overhead associated with that sooner, and so there is a great payoff to the Government if we can shorten the time in which they deliver those airplanes.

Mr. DELLUMS. I see. And in that process, your testimony is that the suppliers out there that you are trying to keep in place to maintain the integrity of the industrial base pending the decision by the administration and the Congress, that they don't play a significant role at this moment in speeding up—in the production of the B–2's?

General HAWLEY. I think that is correct, sir. The people who need to be supported primarily are those who have already delivered out the parts and the components of the airplane and so they are on their way of going out of business, and in order to sustain their capability, we invested the money that Congress authorized last year.

Mr. DELLUMS. I see. Thank you.

Mr. Chairman, there are a few other questions I have, but I could submit them for the record. I would just say that in one sense, I understand the need for these hearings, but we need to come back into a hearing at the time that these folks complete the bomber study. Because in one sense, it is kind of premature because there are a number of questions that we would like to raise that we cannot raise until such time as we have received the report. And I am sure that you can plan to schedule a hearing at the earliest possible date when the report is finished. As I understand, you may slip the April 15 time line and it may come in closer to May 1, or——

Mr. HUNTER. We would hope they don't slip that time line.

What do you say, General?

General LOH. I don't know, sir, but I am told that the Secretary of Defense will receive it about April 15. I presume it could be provided at that time. But they wanted to provide it when you are back in session, which is toward the end of the month rather than the 15th of the month.

Mr. DELLUMS. I don't think you will get a quarrel with anybody in April after the first 100 days, so I look forward to——

Mr. HUNTER. It might be tough to deliver those studies.

Mr. DELLUMS. I look forward to that, Mr. Chairman.

Mr. HUNTER. I think the gentleman raises a good point there.

Let me say, the gentleman from the Appropriations Committee, Mr. Dicks has—and Mr. Skeleton, Ike, before you take off, do you have any other questions you want to ask right now?

Mr. SKELTON. No.

Mr. HUNTER. Thank you, sir.

Mr. Dicks has sat in with us here and we appreciate him bringing his expertise to the committee.

Norm, you are certainly recognized.

Mr. DICKS. Mr. Chairman, I know you have been here a long time; I will be very brief.

I wanted to welcome General Loh, General Hawley. Let me ask you a couple quick questions.

How long is it going to take from when we started the F–22 to field the first F–22? About 15 years?

General HAWLEY. Sir, it is going to be 14 years from the time we began the engineering, manufacturing, and development phase of the program until we achieve initial operational capability on the first squadron.

Mr. DICKS. How long did it take us to do the B–2, to get it from where—from the start of the B–2 program to today? It is about 14 years as I recall. I think it was announced in 1980, and we are now in 1994.

What I wanted to point out to my colleagues is that it takes a long time to build one of these weapon systems, and I believe in my heart that we are at a critical juncture here.

If we kill this program and let it stop, we are going to—and you wait 5 or 6 years and say oh, my God, we made a mistake, it is going to cost us billions and billions of dollars just to reopen the production line.

Isn't that true, General? There is no dispute about that. If we stop this program and then start it up, say, in 2002, it would cost, I have been told, somewhere between $5 and $10 billion just to get back into production. Is that a fair estimate?

General HAWLEY. Sir, I have no reason to doubt that money. It would be a lot of money.

Mr. DICKS. It would be a lot of money.

Mr. HUNTER. Let me ask another way, if the gentleman would yield?

Mr. DICKS. I yield.

Mr. HUNTER. If we close this window, obviously all your reports indicate we need to continue a bomber program because bombers will remain an integral part of our military operations. How do we propose to manufacture more bombers in the future? How will we do that?

General LOH. Well, we would have to start over again.

Mr. HUNTER. Is there any blueprint for that or idea out there how this is going to happen?

Mr. DICKS. No, there isn't.

General LOH. I don't believe there is. That is why this is such a profound decision, because the people will go away and do something else. The technologies will atrophy and you would essentially have to not quite start over, but it would be almost a new start.

Mr. DICKS. The gentleman knows that I am a strong advocate for my State. I went to the Boeing Co., which comes from Washington State, and I asked them, because Chairman Dellums, when he was chairman, made up—presented the idea of a B–3, a next generation bomber. And I asked them, I said, what do you think about that? Because you know, with the way Northrop has had a few problems with its program, Boeing might be the winner of that next contract and be able to build the follow-on bomber.

And they said, Congressman, they said, we have looked at this. If we are going to build another bomber, it would be long range, like the B–2. It would be stealthy, like the B–2. It would carry about as much munitions as the B–2. And they said, our advice to you is not to build a B–3. Our advice to you is to stay with what you have got and make sure you build enough of them so that you have the sortie rates and you have the capability that you are going to need for the future.

But they basically said that this is the bomber that you would build if you were going to build a new bomber, Mr. Chairman.

So my view is, if we are here and we got the industrial base open and it is going to cost us billions and billions and billions of dollars, we have spent $44 billion on this program, and to get only 20 airplanes out of that investment is not right for the American taxpayers.

And if you want to talk about the cost of ownership, I will tell you how you solve that problem. You take out some of the existing, less capable bombers out of the inventory to offset the cost of the 20 B–2's. That will take off about $15 billion of the cost.

And I have explained how you could save another $9 billion making a good—real good decision on supplementing the airlift with some off-the-shelf airplanes Non Developmental Airlift Aircraft [NDAA] Program, that would give you about $9 billion.

So there are ways to do this. I would just say this to my colleagues because cost is the issue everybody is worried about. This year—I asked Don Richford, our clerk on the Appropriations Committee, I said, how much did we just take out of the appropriations markup when we marked up last year?

He said, $3.5 billion of low-priority items, programs ending, all this; there was about $3.5 billion at the bottom of the line that was not needed. And we just went through this exercise, Mr. Chairman, of taking $3 billion out of the Defense budget from low-priority programs and putting them over into readiness. We just did that again.

So there is a way to finance this out of the entire Defense budget. I know General Loh says he has been ordered to say that, you know, there are other priorities. I will tell you, I know what he believes in his heart, and I will ask him.

General LOH. Sir, I have not been ordered to say anything this morning. I have complete free rein to say anything I want this morning.

Mr. DICKS. In your personal and professional judgment, would the U.S. Air Force and the security of this country be better off if we had 20 additional B–2 bombers?

General LOH. I think I answered that question.

Mr. DICKS. I would like you to answer it again.

General LOH. The decision to go to 20 is not made on the basis of what is the right number. It was made on the basis of what is the minimum number required to provide an operational capability. So we don't know what the right number is. We know what the minimum number is. The minimum number is 20.

Mr. HUNTER. Norm, let me rephrase the question.

One thing, General Loh, you have given us some great expertise and you have a couple of hats. One is your hat, your official hat in terms of defending the budget, which is your job, and that is necessary. The other is your personal expertise as a person who has an understanding of the world situation, an understanding of force structure and the service you represent.

In your opinion, is the bomber number that is projected too low?

General LOH. Well, as I had said in my statement, sir, I believe the number that we are funding is short of the number that we need. And as a consequence, we, for the long term, in my profes-

sional opinion, don't have enough. Because I think we are beginning to realize how valuable and important bombers are to long-range power projection in this world of ours, with an Air Force that is predominantly based at home, and so I think bombers have been undervalued somewhat.

When you compare costs of—to do things, you need to compare the cost of doing it with bombers versus the cost of doing it with other systems. This bomber study is going to look at costs of various bombers, but we are beginning to realize that bombers are a pretty efficient way of getting things done.

We can operate and maintain 12 bombers at about $100 million a year. That is not bad when compared to a comparable capability, not even a comparable capability of perhaps other forms of combat power. So I—you know.

Mr. DICKS. That is the answer I expected and I am very pleased with that answer. It is a good answer, a quality answer.

Let me just say this; you know, this is one of those times when I think it is the Congress of the United States, Mr. Chairman, that is going to have to make a judgment here, with the President, I hope, that this is a priority, that this is crucial. And I see a day in the future when you could take the B–2 bomber and with stealth technology and put it—put those sensor-fused weapons on that path talked about in that scenario in which the B–2's interdict Saddam's division and knock out 49 percent of the mechanized vehicles in the field.

We have never had a conventional war-fighting capability of that. I see the day, if we had enough B–2's, we could have some of them at Whiteman, Guam, Diego Garcia where we could cover the entire world and in a matter of hours be able to stop in the field a mechanized division. We have never had that kind of conventional capability before.

I think this is a revolutionary war fighting capability and I think, my own personal judgment is for the first time, we would have—there might be a concept of a conventional deterrent. And we can't use nuclear weapons. We simply are not going to use them.

So if we are going to deter Saddam or the Iranians or the North Koreans in some future situation, we are going to have to do it with conventional capability. And I believe the B–2 bomber with smart sub munitions like sensor-fused weapons and JDAM, give us that conventional capability. And I just will say this; 20 airplanes is not enough to have the sortie rates. The two studies that have been done by RAND and by Jasper Welch both indicate, and I asked Colin Powell at the White House the other day, I asked him, I said, what was your recommendation to Cheney. He said 50 airplanes is what we needed.

Now, obviously, this is a new budget context. I am not saying that he says we need that at this moment, but that was his recommendation at the time.

Everyone who has looked at this says that somewhere between 40 and 60 is the right number. And then you have your B–52's with the standoff cruise missiles that give you some help on the early going with some of the mixed targets. And then all of a sudden, you have got a Bomber Force that can give us a war-winning

capability, and I think deterrence—and I am there for saving lives and saving money; that is why I think this is one of those moments where we have got to stand up and do what is right for the country.

Mr. HUNTER. I thank the gentleman. I thank him for sitting in with us and we will never put Norm Dicks down as undecided on this issue.

Let me tell you, another gentleman who is not undecided on the issue, the distinguished ranking member, I know has a few comments, also.

Mr. DELLUMS. First, I want to make a clarifying point on this B–3 business. The conference report last year simply said that the bomber study could look at options, including a new generation lighter bomber if that was something they wanted to embrace. That is how that came.

I would just like to make one comment, and I listened carefully to my colleague and others here, and everything aside, the cold war is over, the cold war is over, the cold war is over, the Haitis, the Bosnias, the Rwandas of the world.

Mr. DICKS. We just had Iraq, Mr. Chairman. We just had Iraq.

Mr. DELLUMS. Where in the hell are you going to fight that you need more than 20 B–2 bombers is a mystery to me. And I just think that there needs to be some reality to all of this. It is not just about contractors making money. It is about us making judgments about the real world that we see out there, the real threat that we see out there, what are the potential scenarios that we are going to engage in.

And if we continue to see bogeymen around every single corner as if the cold war has not ended and the world has not radically changed and there is not radical potential here for us to move beyond war fighting as a way of addressing the human condition of the world, then we are in serious difficulty. I don't think a thousand bombers or whatever is going to solve that problem.

I just think the world has radically changed and I think we need to change with it. And I think 184 bombers, in my humble opinion, is sufficient to reign terror and grief on most places in the world.

Had they said we are going to fight Saddam Hussein, they said that was the fourth largest army in the world, and within a matter of days, we totally destroyed these people and we didn't have 40 B–2's to do that. But that is a debate we will have another day, another time.

Twenty B–2's, it seems to me, is a silver bullet. It has enormous capacity. What adversary out there are we going to go after that requires us to continue to think like cold warriors? That day is over and we need to move into the 21st century with a much more enlightened view than I am sensing about all these bombers. That is just my point.

Mr. HUNTER. I thank the gentleman for his point of view. And I want to apologize, I have got to leave for a meeting. But I know the gentleman from Maine and the gentleman from Georgia have a couple of additional questions.

So thank you so much for taking us through the six species of acquisition costs. We will never do that to you again, both generals, we assure you. We do need to get that basic graph that shows—

will show members in a very commonsense fashion what these things mean. We also need the fiscal year 1996 numbers for procurement at one-and-a-half a year.

At this point, I want to ask Mr. Chambliss to take the chair for remaining questions and I, Generals, bid you ado. Thank you for being with us.

Mr. Chambliss will conclude the hearing in a few minutes.

General LOH. Thank you, sir.

Mr. CHAMBLISS [presiding]. Let me just say to the—my colleague from Washington, I share your same sentiments. He has gone out on us. I appreciated the General's comments earlier about the fact, as you might expect, the more of these you buy, the cheaper the cost is going to be. Although I understand that the longer you operate an airplane, the more expense you are going to have. But if you buy one automobile that costs you *X* number of dollars, you buy 10, you are going to be able to get a package deal. And that is exactly what I understood you to say earlier and certainly what I would have expected.

I can't help but say to my good friend from California, who I have the utmost respect for, and I know he has been here an awful long time and has sat through a lot of these and has been through many more conflicts than I, obviously, have up here, but I just have to say that I wonder why we were able to do what we did in Iraq, why the cold war ended. I think in large part it goes to all of these gentlemen over here sitting in blue and the equipment they had and the forces that they commanded. And I have a real appreciation for that and the fact that we have got to continue to maintain our services to where we are always in that position.

Mr. DELLUMS. I don't quarrel with that notion. I just think where we end up debating is how much is enough, and that is a legitimate question for the political process. That is why we get paid.

Mr. CHAMBLISS. I wanted to switch gears for just a minute and just inquire for a minute into the munitions aspect of this discussion, and particularly with respect to the TSSAM, which obviously has been canceled. Likewise, with the investment we have got in the B–2, that has to be considered when you think about how much more of an investment or whether to cancel, whether to proceed forward or whatever with the B–2, with the TSSAM, we have got a $3 billion investment and we are walking away from that $3 billion right now.

If I understood what, General, you said in your opening statement, that we would probably be 6 or 8 years away from having a missile to replace that, what that TSSAM was going to be capable of doing. And I have a real concern about that and as I read the report that the virtual umbilical development program will give us a missile—but if I understood also what you said, it is nowhere near what the—has the capabilities of what TSSAM would have. Any time we walk away from any kind of investment, I wonder whether it is a wise decision from the standpoint of the American taxpayer. And I know we had tremendous cost problems associated with that. But I just wonder if either one of you have an opinion on whether or not the TSSAM project is worth revisiting at this point?

General LOH. Sir, I would like to comment. I think we can capture a lot of the technology, particularly the stealth technology that was embodied in the TSSAM Program for the follow-on program, and that will make the follow-on program a lot less expensive than just starting over.

So I think there are some things that we have developed in the TSSAM Program that are still logical and can be made available in the follow-on program.

I think the decision to cancel TSSAM was the right one because—not only was the cost extremely high, but it failed seven of its last nine tests. So again, as the provider of forces, I was losing confidence in its reliability and had little confidence in its reliability. This after many, many years of development.

So it was a cost and a reliability problem that caused me to not—to recommend that we not go forward. Hopefully, we can capture much of the technology that was put into TSSAM and improve its reliability either with the same contractor or another contractor in a competitive program, so that we can achieve the reliability and get the same sort of capability with much less development and acquisition cost. That is our goal.

Mr. CHAMBLISS. Did I understand you correct though that we are probably looking at some 6 or 8 years down the road before you have this——

General LOH. Well, that is a subject that is under discussion right now. If we can take advantage of some of the acquisition reform initiatives that were referred to earlier, we might be able to accelerate that and in my opinion, it should be shorter development time; because we already do have a lot of that development work out of the way that can be applied to a follow on program.

But nonetheless, it is still going to take some time. I believe the testing community is going to want to make sure that this follow-on missile works, and so we are going to have to shoot it a large number of times in order to validate that it does, in fact, have the reliability that the TSSAM did not have. So when you add all of that up and then you have to procure sufficient quantities for operational use, I still think you are talking about five or six years at the minimal.

Mr. CHAMBLISS. OK.

Mr. Longley.

Mr. LONGLEY. Thank you, Mr. Chairman.

I just want to state for the record that this is a continuing scenario of presentations that are made to this committee in terms of the differences between what the bottom-up review has recommended and what it is that we are actually providing, and other issues that relate to how effectively we are using our resources, particularly from the standpoint of whether we are getting the military readiness and particularly the—not only immediate readiness but longer-term readiness, and I think it is important that we recognize that deterrence is a combination of skill, will and capability. And I look at what has happened in the Straits of Hormuz, where the Iranians have put 8,000 troops, chemical weapons, antiship missiles, anti-air missiles in an area through which passed 95 percent of our supplies during Desert Storm. And I only want to

just highlight the issue that I don't—I can't begin to speculate why Iran felt unconstrained in taking the action that it did.

But I am extremely concerned that when we look at the pattern of shortfalls and lack of systems vis-a-vis what professionals have told us we need for military force, that I think that this committee has some very serious questions to look at. And I would also submit to the Department and the respective services, that I think in light of the budget difficulties and pressures that we face—and I want to reiterate that we are going to get this country on the track to a balanced budget in this fiscal—in this current budget scenario in the next couple months. That I think it is going to be incumbent on the services. It is going to be incumbent on this committee to take a very hard look at everything we are doing with our dollars and measuring them against what I consider to be the ultimate quality of life, which is the ability to deter a conflict or if you are faced with the unavoidability of a conflict, to be able to survive it. That ultimately is what is in the best interests of our men and women in uniform and this country.

I just want to state that for the record, because I think we are facing some very hard choices and I think we are going to need to focus on getting some real candor. Because I don't pretend to know whether 184 bombers is adequate or 100 or whatever the number might be. But we have got to get a solid answer to that question. Because the failure or the mistake, if we make one, the consequences are catastrophic, and that is what I would like to say for the record.

Thank you, Mr. Chairman.

Mr. CHAMBLISS. Do either of you gentlemen have anything else you would like to add?

General LOH. No, sir.

Mr. CHAMBLISS. All right.

Let me just conclude by saying that there will be some written questions that will be submitted to you and we would appreciate your responding to them in a timely fashion.

And as a freshman member of this committee, I just want to tell both of you that I very much appreciate your frankness, your very thoroughness in your answers, and dealing with some very sensitive issues and some very difficult issues. And I am just very proud that we have folks like you all associated with our Services.

General Loh, since you and I have gotten to know each other through your supervision and command over a couple of commanders in my district, I just want you to know, too, that just because I understand you are going to be getting out this summer, we are not going to let you get away without leaning on you between now and then and after that time also. And we look forward to working with both of you right on.

Thank you very much for being here today.

[Whereupon, at 1:04 p.m., the subcommittee was adjourned.]

[The following questions were submitted and answered by General Loh and General Hawley:]

SHORT RANGE ACCURATE WEAPONS

Question: Why is the Air Force emphasizing only short-range accuracy weapons such as JDAM, JSOW, etc., at the expense of the bomber forces ability to employ true standoff weapons with ranges sufficient to keep the bombers out of threat engagement envelopes?

General Loh: The Air Force plans to upgrade its heavy bombers to deliver a wide variety of new weapons including both long- and short-range weapons to attack heavily defended targets. We have already integrated several existing medium- and long-range stand-off weapons such as the Conventional Air Launched Cruise Missile (CALCM), the HAVE NAP (AGM-142), and HARPOON (AGM-84) on the B-52H. The apparent delay in integrating other weapons is due to the development lead times for the weapons and the requirement to upgrade the aircraft to employ them. The Tri-Service Stand-off Attack Missile (TSSAM) was to be the base-line long-range bomber weapon. The Air Force canceled this program last year because of both cost and performance problems. We are finalizing requirements for the Joint Air-to-Surface Stand-off Missile (JASSM), an affordable replacement for TSSAM. We plan to integrate JASSM onto the B-52, the B-1, and the B-2.

CALCM CONVERSION

Question: The Congress authorized and appropriated funds in FY 1995 to restart the conversion of the AGM-86B nuclear long range standoff missiles to the conventional variant used in Operation Desert Storm, with strong encouragement for Air Force to continue to program in FY96. The President's Budget, however did not follow the Congressional intent, and did not request funding to continue this economical conversion effort.

a. Given the fact that the Air Force has canceled TSSAM and given the need for more conventional standoff capability for bombers, does the Air Force intend to continue the CALCM conversion?

b. Will the Air Force request a reprogramming for FY96 funding to continue this program?

General Loh:

a. Because of the cancellation of TSSAM, the conversion of additional ALCMs (AGM-86B) is a high priority for the Air Force. Funding was provided in the FY95 budget to convert 100 ALCMs to CALCMs. The Air Force has already indicated to Congress that should additional funds become available it would seek to convert more ALCMs to the conventional variant.

b. At this time, however, the Air Force is not planning to reprogram funds for ALCM to CALCM conversions.

B-52H

Question: With the B-52H projected to be an important part of the Heavy Bomber force for the foreseeable future, it seems likely that there are technology insertion possibilities while reducing costs of ownership and operation. Is the Air Force considering any sort of structured process, such as a "Block Upgrade" approach, which would capitalize on past investments by implementing current technology improvements into the B-52H systems?

Answer: The B-52H is taking full advantage of previous investments to reduce the cost of ownership and operation in its modifications. The Conventional Enhancement Modification (CEM) adds Global Positioning System (GPS); Integrated Conventional Stores Management System (ICSMS) which provides Mil-Std 1760 capability; and the AGM-142 (HAVE NAP) precision guided munition (PGM) . The Air Force removed Group B kits from B-52G models in the Aerospace Maintenance and Regeneration Center (AMARC) for installation in the B-52H to reduce the cost of CEM . In addition, operations and maintenance capabilities previously used on the B-52G modifications are used on the B-52H.

The Offensive Avionics System (OAS) computer on the B-52H is an open architecture design which adapts to new modifications and reduces the cost of installations. Modifications such as the Wind Corrected Munitions Dispenser, Joint Direct Attack Munition, and Joint Standoff Weapon are less expensive to incorporate since the ICSMS system is also open architecture and designed to carry, program, and launch smart weapons.

HEAVY BOMBER MODS

Question: DoD plans to spend billions to modify heavy bombers to improve their conventional capabilities. Of prime importance is providing the bombers with precision-guided munitions capabilities.

a. What are the current and planned capabilities of each of the heavy bombers?

b. How much will it cost to modify the bombers to upgrade their conventional capabilities? How many bombers will be upgraded? How much has been obligated/ spent to date? What is the remaining cost of the program and how much is included in the current FYDP?

c. What alternatives did DoD examine, such as keeping the F-111 in the force structure, before deciding to modify the heavy bombers? What are the current plans for the F-111 and what capabilities will be lost if the F-111 retires? What is the cost of operating and maintaining the F-111 versus the cost of operating and maintaining the bombers?

d. When will precision-guided munitions be available for heavy bombers? How does the munitions procurement schedule match up with the bomber conventional upgrade schedule?

e. What impact has the cancellation of the tri-service standoff attack missile (TSSAM) had on the plans for heavy bombers? How does DoD plan to meet the requirement for TSSAM and what will it cost?

General Loh:

a. See attached bomber weapon capability chart.

b. B-52: The total FY96 PB cost to upgrade the B-52Hs is approximately $246M. The current Air Force plan is to upgrade all 66 B-52Hs. Approximately $95M has been obligated (FYs 93-95). Approximately $151M remains to be obligated/spent in FYs 96-01.

B-1: The total of the B-1 Conventional Mission Upgrade Program (CMUP) is just under $2.4B. This program can be further broken down into Weapons Integration ($1.7B)and Electronic Counter Measures Upgrade ($.7B). This will upgrade all 95 aircraft. Approximately $.2B will have been obligated through FY95,

leaving $2.2B remaining in the program. Of the remaining funding, $1.5B is approved in the FYDP.

B-2: All planned conventional capabilities are included in the B-2 baseline and will be funded within the $44.4B program cap. The entire fleet of 20 aircraft will be fully conventional capable.

c. The decision to upgrade the conventional capabilities of our heavy bomber force was made in response to changes in our national security strategy, not as a trade-off in capabilities with the F-111. With few overseas based forces, only long-range, conventionally-armed bombers provide the immediate and massive precision firepower necessary to respond to the full spectrum of our national security challenges.

The Air Force will begin retiring the F-111 in FY96 due to budgetary constraints. The F-111 is one of several weapon systems that provide us a deep strike, precise munition delivery capability. In the near-term, before the bombers are upgraded, retiring the F-111 will cause us to lose about 25 percent of our PGM delivery capability.

Below are the projected FY95 operating and maintenance costs for our bombers and F-111F.

B-1 (60 PAI)	$450M
B-52 (74 PAI)	$309M
F-111F (54 PAI)	$187M

d. See attached bomber weapons capability chart.

e. To provide a near-term capability the Air Force has requested funds for additional CALCM and AGM-130s. ACC is supporting a buy of about 450 additional HAVE NAPs for its B-52 force. Currently, the Air Force is structuring a new replacement program for the canceled TSSAM. This replacement program, dubbed the Joint Air-to-Surface Stand-off Missile (JASSM), is expected to build on the lessons and technologies of TSSAM with a target cost of less than $600K per unit. The primary goal is affordabilty which may result in some operational tradeoffs to stay close to the unit cost objective. Current planning would achieve a limited operational capability around the turn of the century.

BOMBER SUPPORT IN 2 MRCs

Question: If the United States is involved in two nearly simultaneous MRCs, what are the major limiting factors in shifting bombers from one theater to another? Will bombers have enough Readiness Spares Packages to support operations in two theaters?

General Loh: There are several limiting factors that will impact our ability to "swing" forces. The first consideration will always be "do the conditions in the first MRC allow us to swing forces out of that fight to a second MRC without jeopardizing the outcome of the first conflict." The answer to that question will define the alternatives available for the second conflict. Operationally, airlift and air refueling will be limiting factors as they sustain the first MRC, begin deployment of forces to the second MRC and support the swing of forces from MRC 1 to MRC 2. In addition to supporting US forces, it's probable that at least air refueling forces will also be supporting allied forces. Logistically, we plan to use readiness spares packages for the initial phase of an operation until the supply pipeline is in place, but we have not procured duplicate packages to support swing forces during the early stages of the second MRC. The requirement to swing from one theater to another

was not considered in sizing the current kits, and as a consequence the impact of swing on logistics support is uncertain. Probably the toughest limiting factor in swing strategy and the one we know least about is the impact on the human element as crews and support personnel swing from one major war to another without any recovery time. We have little experience from which to gauge the impact on the individual members of our operational units.

B-52H REPLACEMENT

Question: The B-52H is the only aircraft capable of delivering nuclear cruise missiles.

a. Does DoD have plans to replace the B-52H?

b. If not, does DoD have plans to extend the life of the B-52 beyond its current serviceable life?

General Loh:

a. Presently, DoD does not have plans to replace the B-52H.

b. Currently, the Air Force has no plans to extend the service life of the B-52. The B-52H is capable of flying until approximately 2035, based upon its wing upper surface economic limit of between 31,200 and 35,200 flight hours. The high time B-52H has about 16,000 flying hours and the fleet averages only 350 flying hours a year. The aircraft structural limitations do not account for possible requirements for an engine upgrade or avionics replacement.

NUCLEAR WITHHOLD

Question: In the future, the B-2 and the B-52 could be tasked to respond to two nearly simultaneous conflicts while at the same time retaining a nuclear role. Should one or more MRCs occur, would DoD apportion all of its B-2s and B-52s to warfighting CINCs, if they requested them, or will DoD policy be to retain a certain number of B-52s and/or B-2s as a nuclear withhold?

General Loh: The National Command Authority would direct ACC to allocate its forces to best meet the threat. There is no policy to rule out the DoD allocating all B-2s and B-52s to one or more MRCs. Conversely, there is no DoD policy preventing the use of a "nuclear withhold" of B-2s and B-52s. However, we would deploy 100 conventionally-armed bombers to a single MRC. This year we have only 84 combat bombers to deploy. So, we would be hard pressed to withhold any for nuclear alert.

SRAM REPLACEMENT

Question: Because of problems, the short-range attack missile (SRAM) was taken out of service. Its replacement, the SRAM II, was canceled because of problems meeting performance requirements. Is there currently a need for a SRAM-type weapon for bombers for short-range nuclear delivery capability? If yes, what plans are in progress?

General Loh: The Air Force has no requirement for a SRAM-type nuclear weapon for bombers.

RESERVE B-52 NUCLEAR TASKING

Question: The Air Force has moved some B-52s with nuclear-tasking to an Air Force reserve unit. How will the Air Force ensure readiness for the nuclear mission

for nuclear-tasked bombers assigned to an Air Force Reserve unit? Why are nuclear-tasked aircraft being placed in the reserves?

General Loh: The personnel assigned to the 917 WG (AFRES) at Barksdale are not nuclear tasked; they maintain only a conventional qualification. If aircraft were required for nuclear tasking, AFRES B-52s would be manned by available active duty aircrews from active duty B-52 units. The Air Force ensures the nuclear qualifications of the AFRES B-52s by having active duty personnel generate and evaluate the aircraft twice a year as part of a practice nuclear scenario.

Aircraft were transferred to the AFRES to provide a robust conventional warfighting capability while maintaining a credible nuclear deterrent capability at a reduced cost.

ANG B-1 READINESS

Question: The Air National Guard recently began flying the B-1 at McConnell AFB.

a. Is the Air Guard unit combat ready? If not, when will the unit be combat ready?

b. Does the cost to get the B-1 fleet to a 75 percent mission capable rate in the B-1 ORA final report include the B-1s at McConnell?

General Loh:

a. The 127 BS (184 BG, McConnell AFB KS) is currently in the middle of an accelerated conversion from F-16s to B-1Bs and is not yet combat ready. The target date for this unit to be fully combat ready is January of 1996.

b. The cost analysis projection shown in the B-1 ORA final report to take the fleet to a 75% MC rate includes the ANG B-1s at McConnell.

Bottom-Up Review

Question: DOD's Bottom-Up Review identified a need to retain up to 184 heavy bombers in the force structure. Moreover, it concluded that 100 bombers are needed to execute the strategy for a single MRC and that some specialized or unique assets such as the B-2 might be "dual-tasked," that is, used in two MRCs. How did the DOD determine that 100 bombers are needed for one MRC? What key assumptions were used in analyzing heavy bomber requirements? Were bombers included in the campaign modeling conducted by JCS during the Bottom-Up Review?

Answer: The bomber force structure identified in the Bottom-Up Review resulted from a detailed analysis performed by the Joint Staff to identify overall force requirements for a single MRC. The BUR identified the need for 100 bombers for a single MRC. To fight a two nearly simultaneous MRC strategy certain "high-leverage" assets such as the B-2, F-117, and JSTARS, that exist in limited numbers, are required to "swing" from the first theater to the second. The BUR analysis assumed the current bomber force mix of B-1s, B-2s, and B-52s would remain viable for the remainder of this century. As the B-2 force buy had been capped by Congress, DOD did not assume a further increase in B-2 numbers. The analysis did include programmed modifications and enhancements to the B-1 and B-52 forces.

Question: How does the BUR requirement compare with the Air Force's planned bomber force? Explain any differences.

Answer: The BUR concluded that a heavy bomber force of "up to 184 bombers" would be sufficient to field 100 heavy bombers to a single major regional conflict (MRC). The Air Force plan of 181 bombers provides sufficient force structure, employing B-1s, B-2s and B-52s, to provide a war-fighting CINC 100 deployable heavy bombers by 1999.

Question: Where did the number 184 come from? Was this the number of bombers in the FYDP at the time the Bottom-Up Review was conducted? How does this number relate to the requirement for 210 bombers included in the Air Force's Bomber Roadmap?

Answer: The difference between the Bomber Roadmap numbers and the BUR numbers is largely a matter of counting. The BUR analyzed the force structure required to fight a two nearly simultaneous MRC strategy. To do so required the deployment of bomber aircraft from the CONUS to the operational theater. The total number required to support 100 bombers capable of deploying in an MRC situation was 184 -- 85 B-1s, 20 B-2s, 79 B-52s. This mix permited 42 B-1s, 42 B-52s, and 16 B-2s to deploy at a combat crew ratio of 2.0. The projected total number of bomber aircraft in the Air Force inventory at the turn of the century at the time the BUR was conducted was 211 – 96 B-1s, 95 B-52s, and 20 B-2s; this number includes two B-1s and one B-52 test aircraft. This is the number Air Combat Command (ACC) used to develop its requirements for funding all bomber operations.

Question: In February 1994, two warfighting CINCs began a study to the options for responding to two nearly simultaneous conflicts with the Bottom-Up Review force based on a scenario that differs from the Defense Planning Guidance scenario. The commands have a different concept than the May 1994 Defense Planning Guidance -- of how U.S. forces and supporting capabilities should be allocated and deployed, including the (1) mix of combat forces needed in each conflict, (2) timing of force deployments, and (3) allocation of mobility assets. The commands recently reported their results, including their conclusions about airpower issues, to JCS. What did the CINC'S study conclude about how many and what types of bombers would be needed to respond to two nearly simultaneous MRCs? Did the CINCs' study validate the BUR's conclusion that 100 bombers would be needed for one MRC?

Answer: USCENTCOM and USPACOM provided their input to the update of the Joint Strategic Capabilities Plan (JSCP) and the requirement that they plan for the possibility of their theater being second in a two MRC scenario. There was not a formal study and no final product was provided by the CINCs. However, the CINCs identified their continuing need for bombers, and 100 percent of available bombers are apportioned in the JSCP to these theaters. Both CINCs iterated the value of air power and validated the requirement to deploy up to 100 bombers to their theater of operations. The type and numbers of bombers required by the CINCs include those currently capable of deploying and delivering the proper munitions against specific target sets. The recent NIMBLE DANCER wargame hosted by the CJCS, validated the requirement for 100 deployable bombers in support of the BUR force structure, and the CINCs agree with this position.

CINC's Requirements

Question: What percentage of targets were bombers assigned to attack during the initial and later phases of each MRC examined?

Answer: Bombers were assigned targets in accordance with the number of other assets available, munitions available, and overall campaign objectives. Percent of targets attacked by bombers range from 6 percent to 25 percent of targets available based on factors such as the scenario warning time, available assets, and weather. The percentage of targets attacked decreases over time for the bomber force, but the total muntions dropped remains consistently higher than other assets.

Nimble Dancer

Question: The JCS has recently conducted two exercises campaign analyses to assess specific warfighting requirements needed to execute the 1-MRC strategy based on the Defense Planning Guidance. These exercises, known as NIMBLE DANCER I and II, focused on the late 1990 and early 2000 time frames, respectively, and used the Joint Staff's TACWAR campaign analysis model. How many and what types of bombers were used in the Joint Staff's campaign analysis for each MRC examined and what types of munitions did bombers use? What types and what percentage of targets were assigned to bombers during the initial and later phases of MRCs included in the analysis?

Answer: The NIMBLE DANCER wargame focused on the two MRC strategy and was the CJCS response to Congress validating the BUR force structure. The two wargames used different numbers of bombers and different types of munitions based on the year the scenario was run. NIMBLE DANCER I played the BUR force structure available in FY 97 transition force levels. This included 190 available B-1 and B-52 bombers of which up to 100 deployed for both MRCs. NIMBLE DANCER II set in FY 2005, played up to 179 available B-1, B-2, and B-52 bombers of which up to 100 deployed for both MRCs. (The lower number of bombers in 2005 reflects the DOD decision to reduce the number of B-52s from 95 to 66 per the Nuclear Posture Review recommendation.) Munitions used were commensurate with planned modifications and upgrades to the aircraft programmed for completion by the scenario year. Assignment and percentage of targets given to bombers during all phases of the campaign were based on the numbers of aircraft and types of munitions available. During the initial phases, bomber attacks were concentrated in the interdiction and strategic areas to halt the armor attack and disrupt the enemy's ability to wage war. Follow-on phases employed bombers in all areas.

Question: What conclusions were reached during NIMBLE DANCERS I and II about the contributions of bombers in halting and defeating opposing forces?

Answer: The NIMBLE DANCER wargames concluded that the bomber contribution, as an integral part of the air package, is essential to the timely halt and defeat of enemy forces.

Question: What conclusions were reached about whether and when bombers can swing to a second theater if a second MRC arises?

Answer: Certain bomber forces were swung from the first theater to the second when their target base was reduced and sufficient fighter bomber assets were in the first theater to backfill the departing bombers. The wargame concluded that some portion of the bomber force must swing between theaters to ensure the attacking force in the second theater is halted in a timely fashion.

Congressionally-Mandated Heavy Bomber Study

Question: Section 133 of the National Defense Authorization Act for Fiscal Year 1995 and section 8101 of the Department of Defense Appropriations Act, 1995, require the Secretary of Defense to study bomber requirements and to provide an independent cost-effectiveness analysis of Air Force bomber programs. DOD has tasked the Institute of Defense Analysis for doing most of the analysis associated with this study. DOD has instructed IDA to use assumptions included in the Defense Planning Guidance as the starting point for the study. An executive committee chaired by the USD(A&T) and composed of representatives from OSD, JCS, and the services are providing overall guidance and are approving the specific assumptions and excursions used in the modeling- IDA is using a number of models in conducting the analysis including JCS's TACWAR model and the Air Force's THUNDER model. What is the status of the study and how soon can the results be expected? Will the analysis for all three time frames specified in the legislation (i.e., 1998, 2006, and 2014) be complete by April 15? If not, when will the final report be completed?

Answer: Part One of the DOD FY 95 Heavy Bomber Study to determine bomber requirements and perform an independent cost-effectiveness study of Air Force bomber programs was completed by IDA on 15 Apr 95. The results were briefed to Congress on 3 May 95.

Question: What force structure alternatives will be examined in the study and what is the rationale for each?

Answer: IDA evaluated the following five basic alternative bomber-force structures in the study.
(B-52/B-1/B-2). These options provided a force structure baseline for IDA to use.

		1998	2006	2014
Option 1	96 PB	66/95/20	66/95/20	66/95/20
Option 2	Max force	94/95/20	94/95/20	94/95/20
Option 3	Low force	94/0/20	94/0/20	94/0/20
Option 4	Retire B-1+ 20 B-2	94/0/20	94/0/27	94/0/40
Option 5	96 PB + 20 B-2	66/95/20	66/95/27	66/95/40

The DOD executive committee determined these mixes to best define the potential force structures for the future. Option 1 is what is currently funded by DOD; option 2 retained the full complement of B-52s and addressed concerns about the near-term retirement of the conventionally capable B-52; option 3 reflected the savings and capability lost with the retirement of the B-1; option 4 added 20 B-2s to option 3 (total of 40) to address the requirement to evaluate an additional B-2 buy, and; option 5 reflected the current force with 20 additional B-2s.

Question: How does the threat for the three time frames being examined differ with regard to the scenarios being examined and number and types of weapons belonging to opposing forces?

Answer: The threats used in the FY 95 Heavy Bomber Study were based on the three time frames studied and approved by DIA. Each threat year was examined separately and the best estimate obtained based on current analysis. Projected enemy force structure and capability was, on the average, increased to account for improvements and availability of advanced technology.

Question: Explain the role of the campaign models being used in the analysis (i.e., TACWAR and THUNDER) and describe how they differ. To what extent, if at all, can these models account for differences in the quality of equipment, personnel and training between U.S. and enemy forces that could significantly affect the outcome of the battle?

Answer: The TACWAR model is a widely used and accepted campaign simulation tool. TACWAR is used by the Joint Staff, Army, and the CINCs to model campaign level operations. TACWARs limitation is that it is a force on force model, designed for ground maneuver warfare. It does not model aerial warfare in sufficient detail to warrant making campaign decisions because it does not take into account the three dimensional aspect of aerial warfare. It requires significant user input in the aerial arena to compensate for this lack of fidelity. THUNDER is a stochastic (Monte Carlo) type model that is optimized for aerial warfare versus ground warfare. It is employed by the Air Force, all major defense contractors, and various allied ministries of defense. THUNDER does model ground maneuver, but not to the level of detail in TACWAR. The two models used together provide a more complete picture of a campaign. The models will accurately portray the capabilities of enemy systems if the correct parameters for those systems are entered. In addition, both models allow for user input to modify any tactics that could affect a campaign's outcome.

Question: In conducting the study, what assumptions are DOD/IDA making about the following and how do they differ from the assumption used in the analysis conducted for NIMBLE DANCER, the Air Force's Bomber Roadmap, and the Bottom-up Review?

-- number and types of targets
-- sortie rates for bombers during the initial and later phases of conflicts
-- availability of in-theater basing for bombers and other assets during the initial phase
-- number of bombers used during each MRC
-- number of bombers swung to second MRC and timing of swing

Answer: IDA used the NIMBLE DANCER TACWAR database as the baseline for the analysis. NIMBLE DANCER was based on the BUR force structure. The numbers and types of targets for the analysis were obtained from DIA threat analysis and the Air Combat Command Bomber Roadmap. The Air Force provided data on sorties rates, basing, and available bombers for each time frame. When assets swung from one theater to the next was based on the reduction of the bomber target base in the first theater and sufficient backfill assets available to cover the bombers departure.

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Question: To what extent is the bomber's nuclear role being considered by DOD/IDA in conducting the heavy bomber study? In determining the number of bombers available to deploy to two nearly simultaneous conflicts, is DOD/IDA assuming any nuclear withhold or set aside?

Answer: ~~The question of a nuclear withhold was not considered by IDA or DOD in the FY 95 Heavy Bomber Study.~~ The study ~~determined~~ objective was to determine the bomber requirements to support a two nearly simultaneous MRC conventional warfare scenario. Since the nuclear withhold question was considered, DOD determined that if a nuclear contingency were to develop: 1) the U.S. would not become involved in a second MRC; 2) sufficient warning time would be available to recall the appropriate number of bombers necessary to fulfill a nuclear commitment; and, 3) during a two MRC situation, sufficient nuclear assets in the form of ICBMs and SLBMs remain as a deterrent force to any potential adversary. All available bombers were therefore capable of deploying in the two nearly simultaneous MRC context. ~~No nuclear withhold was employed.~~

B-1 ISSUES

Question: Currently, the only conventional munitions the B-1 can deliver is a 500 pound bomb. When will the B-1 have a capability to deliver other conventional bombs? What are the munitions? When will the B-1 have a capability to deliver precision-guided munitions?

Answer: The B-1 program has satisfactorily completed development testing on CBU-87s (Combined Effect Munitions) and CBU-89s (GATOR mines). The B-1 will carry the CBU-87 and CBU-89 in FY96, the CBU-97 (Sensor-Fused Weapon) around the turn of the century, and the Wind Corrected Munitions Dispenser (WCMD) in FY02. The B-1 will incorporate Joint Direct Attack Munitions (JDAM) in FY01 and Joint Stand-Off Weapons (JSOW) in FY03. Additionally, the B-1 will carry Joint Air-To-Surface Stand-Off Missiles (JASSM) when they are fielded.

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